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PREFACE.

ONE of the great advantages arising from a study of Natural History is that it is practically inexhaustible. Fresh facts are being brought to light every day, and the more we study them the more we find there is to learn. The truth of this is forcibly impressed upon us as we reflect that the present number of 'The Zoologist' brings to a close the forty-fourth annual volume of this journal. In point of interest and originality it is perhaps not inferior to any of its predecessors, as a glance at the contents will show.

The establishment of a Marine Biological Laboratory at Plymouth (p. 24) marks a new era in the history of biological science in this country, and gives a fresh impulse to scientific research.

The labours of the Committee appointed by the British Association to collect information relating to the Migration of Birds have resulted in the publication, during the past year, of a Seventh Annual Report (p. 460), embodying statistics of much interest and value. It is to be hoped that this Committee will receive a sufficient measure of support to encourage a continuance of their work until such time as the materials amassed by them will enable a practical solution of the many interesting problems attending the subject of their enquiry.

Of the great utility of 'The Zoological Record' we have frequently had occasion to speak. For workers in every branch of Zoology no more useful annual has ever been designed, and we are surprised to learn that it is not universally supported by local Natural History Societies throughout the country. We would strongly urge the secretaries of such societies to recommend this annual volume for purchase, not only on account of the benefit which the members would derive from consulting it, but because the expense incurred in its production is so great that, without wider support than is at present accorded, it can scarcely be maintained.

It is satisfactory to note throughout the pages of the present volume the scattered contributions towards a better knowledge of the fauna of Ireland, a subject which has been somewhat neglected. Professor Haddon's review of recent contributions to the Marine Invertebrates (pp. 1-8) it is to be hoped will stimulate further research in this direction; while the communications of Messrs. Ussher on the Birds of the Saltees and Kerraghs (pp. 88-98), and the breeding of the Fork-tailed Petrel on the Blasquets (p. 367), Warren on the summer birds visiting Mayo (pp. 296, 297), Cockerell on the Mollusca of the Skelligs (pp. 418-420), and Ellison on some of the rarer species in Wicklow (pp. 489, 490, form additions to the Zoology of Ireland which should not be overlooked. Nor should Dr. Benson's recently published

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book on Irish Song Birds (p. 384) be left unmentioned, seeing the good example which it sets to other resident naturalists in Ireland.

Of the longer and more important articles which have appeared in these pages during the past year a few may be specially noticed as of more than ordinary interest. Amongst these are Mr. Seebohm's critical reviews of the genera *Hæmatopus* (pp. 41-49) and *Numenius* (pp. 137-148), and the same writer's interesting remarks (p. 225) on the Pheasant of St. Helena, *Phasianus torquatus*, which, although imported thither more than 300 years ago, and subjected to a different climate and new conditions of life, has in all that time altered so little as to be practically indistinguishable at the present day from examples of the parent stock from China.

There is still so much to be learnt respecting the Cetacea, that Mr. Southwell's account of the voyage of 'The Eclipse' (pp. 50-54) and Mr. Heneage Cocks' Report on the Finwhale Fishery on the North European Coast (pp. 121-136) are useful contributions towards the life-history of these marine monsters.

An article on "Beavers and their ways" (pp. 265-286) embodies the chief facts of interest concerning the structure, habits, systematic position, and present geographical distribution of these curious animals in Europe and America, with remarks on the former existence of Beavers in Great Britain.

From an archæological point of view the facts stated in an article "On the former Nesting of the Spoonbill in Middlesex" (pp. 81-88), illustrated by Charles Whymper, are of special interest to ornithologists, since they relate to a hitherto unsuspected breeding-haunt of a very singular bird, whose nesting in England has not been recorded oftener than on two previous occasions.

The advent to this country of birds, which are either visitors for the first time or of very rare occurrence here, is always a matter of interest. During the past year the following species have been reported to have been met with, namely:—The Continental Black-headed Bunting *Emberiza melanocephala* (p. 73), the Nutcracker (p. 182), Tengmalm's Owl (p. 214), Blue Throat (p. 249), Icterine Warbler (pp. 333, 334), Yellow-browed Warbler (p. 487), Tawny Pipit and Citril Finch (p. 490), King Duck and Hooded Merganser (p. 335).

The variety of these communications (with others which we have not space to notice) betokens a degree of activity amongst the contributors to this journal which is very satisfactory. The editor would fain hope that in the new year which is about to commence he may continue to receive no less convincing proofs of the interest which they take in this publication, and the cause which it is intended to serve.

It should be borne in mind by the readers of 'The Zoologist' that the contributors really make it what it is, and that if any improvement be still needed it rests with them to effect it.

It seems not too much to expect that a journal like 'The Zoologist,' which has been in progress for more than forty years, should continue to receive that genuine support from naturalists which its proprietor, Mr. Newman, has so long, with public spirit, endeavoured to deserve.

J. E. H.

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RECENT CONTRIBUTIONS TO THE MARINE INVERTEBRATE FAUNA OF IRELAND.

BY PROF. A. C. HADDON, M.A., M.R.I.A.

THE following summary of papers published within the last two years is intended to inform naturalists of the more interesting species of marine Invertebrates which have recently been recorded from Irish waters, many of which were previously unknown to occur in Ireland.

I. *The Foraminifera of Galway.* By F. P. Balkwill and F. W. Millet. *Journal of Microscopy and Natural Science*, iii. pp. 1—22, pls. i.—iv. (1884).

In taking a general review of the Foraminifera of Galway, “there may be noticed the absence of *Biloculina ringens*, the moderate frequency of *Miliolina fusca* and *Ammodiscus gordialis*, and the occurrence of a few fine specimens of *A. shoneana*. The flattened forms of *Lagena* are remarkably abundant, giving rise, as might be expected, to varieties; among the rarer forms are *Lagena pulchella*, *L. faba*, *L. bicarinata*, *L. fimbriata*, and *L. clathrata* (the last two not having been previously recorded as British species), and a variety between *L. clathrata* and *L. castrensis*.”

“*Lingulina carinata* occurs. The *Nodosarinæ*, *Dentalinæ*, and *Cristallariæ* are but poorly represented. Among the *Polymorphinæ* we have the rare *Polymorphina myristiformis*, *P. complanata*, a

species new to Great Britain, and an example of *P. compressa* with a short Entosolenian tube. *Globigerina bulloides* occurs plentifully, and is accompanied by the rarer *G. inflata*."

"Among the *Textulariæ* and *Bolivinæ*, *T. difformis* is remarkably frequent; *B. levigata* and *B. dilatata* are also more common than is usual on the east coast of Ireland: on the other hand, the rarity of *Verneuilina polystropha* is equally striking."

5/ "The *Buliminas*, including *Virgulina schreibersii*, are well represented, and the material is especially rich in its *Cassidulinæ* and *Discorbinaæ*; *Discorbina parisiensis* and *D. wrightii* are very frequent. The latter often occurs double, and sometimes treble. *D. orbicularis*—first noticed as British by Balkwill and Wright (*vide infra*) in their Dublin shore-gatherings—seldom occurs in the typical form, but its wild-growing variety is extremely common. *Operculina ammonoides* is not often met with."

Some new varieties of *Lagenæ* are figured, and a species of *Ramulina* new to Britain, which is not named. *Lagena faba*, sp. n., is both described and figured (p. 13, pl. ii. fig. 10).

II. *Note on the Occurrence of some Foraminifera in the Irish Sea.*

By C. Elcock. Ann. and Mag. Nat. Hist. (5), xiv. pp. 366—7 (1884).

The following were obtained south-west of the Isle of Man from 70 to 75 fathoms:—*Technitella legumen*, Norm., *Lagena hertwigiana*, Brady. The first Irish locality recorded for both species; also *Hyperammina elongata*, *Reophax scorpiurus*, *Haplophragmium pseudospirale*, &c.

III. *Report on some recent Foraminifera found off the Coast of Dublin and in the Irish Sea.* By F. P. Balkwill and J. Wright. Trans. R. Irish Acad. xxviii. (Science), pp. 317—372, pls. xii.—xiv. (1885).

This is an admirable Report on the Foraminifera obtained off the Dublin coast, of which an abstract appeared in the Proc. Roy. Irish Acad. (2nd ser.), iii. (Science), 1883, p. 545—550.

The following species are figured:—*Biloculina ringens*, Lamk., var.; **Spiroloculina acutimargo*, Brady, woodcut; *Miliolina tenuis*, Czjzek; *M. subrotunda*, Mont.; *M. ferussacii*, d'Orb., var., near *M. sclerotica*, Karrer; *M. agglutinans*, d'Orb.; **Ophthalmidium carinatum*, nov. sp.; *Cornuspira foliacea*, Phil.; *C. in-*

volvens, Reuss.; *Hyperammia elongata*, Brady; *Reophax scopiurus*, Montf.; *R.* (?) sp.; *Haplophragmium pseudospirale*, Will.; **H. agglutinans*, d'Orb.; *Ammodiscus charoides*, J. & P.; *Trochaminata inflata*, Mont., var.; *Textularia sagittula*, Defr.; *T. gramen*, d'Orb.; *Spiroplecta biformis*, J. & P., and woodcut; *Lagena lineata*, Will.; *L. aspera*, Reuss.; **L. curvilineata*, nov. sp.; *L. sulcata*, W. & J.; *L. costata*, Will.; *L. williamsoni*, Alc.; *L. crenata*, P. & J.; *L. striato-punctata*, P. & J.; **L. feildeniana*, Brady; *L. squamosa*, Mont.; *L. lagenoides*, Will.; *L. bicarinata*, Terqu.; **L. castrensis*. Schwager; *L. pulchella*, Brady; *Nodosaria raphanus*, Linn.; *N. pyrula*, d'Orb.; **N. hispida*, d'Orb.; * (?) *Rhabdagonium tricarinatum*, d'Orb.; *Marginulina glabra*, d'Orb.; *Polymorphina spinosa*, d'Orb.; *Pullenia sphæroides*, d'Orb.; **P. quinqueloba*, Reuss.; *Spirillina vivipara*, Ehrenb.; **Discorbina orbicularis*, Terq.; **D. tuberculata*, nov. sp.; **Nonionina pauperata*, nov. sp.; **N. boueana*, d'Orb.

Of the 147 species and varieties recorded, 13 are new to Britain (indicated in the above list by an asterisk *), and 3 are new to Science.

IV. *Report on Irish Zoophytes. Part I. On some Rare Sea Anemones taken at Greystones, Co. Wicklow, with Remarks on the Marine Invertebrate Fauna of that District. By H. W. Mackintosh, Proc. R. Irish Acad. (2), IV. (Science), pp. 52—58 (1884).*

The two following *Actiniæ* are new to Ireland: *Bolocera* (?) *eques*, Gosse, which the author considers belongs to the genus *Tealia*, and *Stomphia churchiæ*, Gosse; both from twelve fathoms off Greystones. *Adamsia palliata*, Johnst., var. *rhodopsis*, Gosse, from twelve fathoms off Greystones, and also from Portrush. *Aureliana heterocera*, Thomps., is recorded from between tide-marks at Greystones. [This requires confirmation, as it was seen by a young friend of Prof. Mackintosh's, and not by himself. —A. C. H.]

An account is given of the nature of the ground and of the *facies* of the fauna of that district, as also a list of common Mollusca.

Loligo magna [sic] (= *L. vulgaris*) is very abundant.

“Occasionally, but very rarely, *Octopus vulgaris* is taken in the seines, but this species seems to frequent deeper water than

Loligo, and so is seldom seen. Last August [1883], when walking along the North Strand, I counted five successive hauls of *Loligo*, making a total of at least one hundred and fifty specimens, and in one of the larger hauls occurred a small *Octopus*, the only one I have seen; I was told by one of the fishermen that they are sometimes taken on the long lines during winter and spring."

[I have quoted this at length, as there is a certain amount of interest attached to the occurrence of the *Octopus* in Ireland. Forbes and Hanley say:—"Dr. Robert Ball procured it at Plymouth in 1841. The reputed Irish localities are very doubtful," vol. iv. p. 210. Gwyn Jeffreys also states:—"Irish coasts, 'not uncommon' (Templeton, *vide* Thompson). But *Eledone cirrosa* may have been in many cases mistaken for this species," vol. v. p. 144. The exact statement in Thompson's 'Natural History of Ireland,' vol. iv. p. 270, is—"O. vulgaris, Lam. Not uncommon, Temp. MSS. (Probably the following species is meant.—R. Ball)." In the 'Report of the British Association for 1840,' p. 249, Thompson says "the omission of *Eledone octopodia* [*E. cirrhosa*] from his [Templeton's] catalogue, leads me to believe that this latter was the species meant." In the 'Guide to the City and County of Dublin,' Hodges, Forster, and Figgis, 1878, pt. ii. Fauna, p. 70, Dr. A. Macalister (now of Cambridge) is answerable for *Octopus vulgaris* having been found at Bray. There is, in the Dublin University Museum, a specimen of a true *Octopus* from "Dublin Bay," but with no history, and therefore of doubtful authenticity. Lastly, we have the record just quoted, but concerning which it is necessary to say a few words. Prof. Mackintosh informs me that he did not take away the specimen he saw lying on the shore, and consequently did not compare it with any description; but he is morally certain that his identification is correct. The fisherman's statement merely refers to a short-bodied Octopod as opposed to a Squid, and this evidence is worthless, as, in common with other local naturalists, I can testify that *Eledone cirrhosa*, Lam., is commonly caught during the winter months on fishermen's lines off the piers at Kingstown, and they have also been found stranded there on the beach by Mr. Dixon, who showed them to me. The direct evidence of the Irish habitat of *Octopus vulgaris* is thus narrowed to the statements of Professors Macalister and

Mackintosh, with no specimens to support them, and a specimen in the Museum of Trinity College, Dublin, labelled "Dublin Bay," and said to have been presented by the late Mr. Goode.—A. C. H.]

Two specimens of *Tritonia hombergii* were taken.

Amongst the Crustacea may be noted *Ebalia pennantii*, *Atelecyclus heterodon*, *Pagurus ulidianus*, *Munida rondelietii*, &c.

Very few Worms and Ascidians are mentioned. The Echinodermata are *Comatula rosacea* (scarce), *Ophiura texturata* and *O. albida* (both rather scarce), *Ophiocoma neglecta* (scarce), *O. granulata* (not very common, but remarkably large), *Ophiothrix rosula* (prodigious numbers), *Asterias rubens*, *Cribrella oculata*, *Solaster papposa* (very abundant, often of large size), *Asterias gibbosa* (not very common), *Echinus esculentus*, *E. miliaris* (both very common). No *Holothuria* were obtained.

Rhizostoma pulmo, *Aurelia aurita*, *Pleurobrachia pileus*, and *P. pomiformis* are noted, and one or two common sponges.

V. *A New Species of Halcampa (H. Andresii) from Malahide.*

By A. C. Haddon, Proc. R. Dub. Soc. (N. S.), iv. pp. 396-8, pl. xvi. figs. 1—4 (1885).

Upon a subsequent examination of a number of individuals this species was withdrawn at the November meeting of the Royal Dublin Society of the same year (*cf.* Ann. and Mag. Nat. Hist. (5th ser.), xvi. (1885), p. 523, and *infra*), as it proved to be a variety of that extremely variable species, *H. chrysanthellum*, Gosse. It was first found in Ireland by Miss Shannon in September, 1883, at Malahide, Co. Dublin.

VI. *The Structure and Habits of Peachia hastata* (Gosse). By A. C. Haddon and G. J. Dixon. Ibid., pp. 399—406, pl. xvi. figs. 5—8, and pl. xvii. xviii. (1885).

This species was first found in Ireland (Dollymount, Dublin Bay) by Mr. Dixon, and exhibited by him before the Royal Dublin Society on Nov. 17th, 1884. The paper gives a full bibliography and a careful description with additional notes on the habits of this interesting form. The synonymy is *Actinia cylindrica*, Reid, and *Siphonactinia hastata*, Andres (Gosse sp.).

VII. *Preliminary Report on the Fauna of Dublin Bay.* By A. C. Haddon, Proc. Royal Irish Acad. ser. 2, IV. Science, pp. 523—530. (1885).

A short account of forms new to Dublin Bay and the neighbouring coast, or which are otherwise interesting:—**Haliphysema tumanowiczii*, Bow, from Dalkey Island, is the only rhizopod noted. The hydroids noticed are *Coryne pusilla*, Gärtn., *C. vaginata*, Hincks, **Garveia nutans*, T. S. Wr., *Tubularia indivisa*, Linn., and *T. humilis*, Allm.; all from Dalkey Island. **Syn-coryne eximia*, Allm., **Corymorpha nutans*, Allm. (? of Sars), and **Eudendrium capillare*, Ald.; from Scotch Bay, Kingstown. **Obelia flabellata*, Hincks, *Gonothyra loréni*, Allm., *Lafoëa pocillum*, Hincks, **L. pygmæa*, Ald., **Diphasia attenuata*, Hincks.

The following Medusæ were obtained:—*Steenstrupia rubra*, Forbes (= *Corymorpha nutans*, Allm.), *Sarsia tubulosa*, *S. pattersonii*, sp. nov. (provisional name for the form described in Forbes' 'Naked Eyed Medusæ,' p. 56, which was found by Mr. Patterson at Larne, Co. Antrim, and which also occurs in Dublin Bay), *Tiara octona*, Forbes, *Thaumantias hemispherica*, Gron., *T. inconspicua*, Forbes, **T. globosa*, Forbes. Our knowledge of the forms usually included under the genus *Thaumantias* is at present in a very unsatisfactory condition. *Margelis britannica*, Forbes (the nomenclature of this species is discussed). *Dipleurosoma hemispherica*, Allm., a remarkable Medusa with irregular gastro-vascular canals and generative organs, first described by Allman ('Nature,' ix. 1873, p. 73) as *Ametrangia hemispherica*, and renamed by Haeckel *D. irregulare*. [It is just possible that this is the same form as that described by J. R. Greene (Nat. Hist. Rev. iv. 1857, p. 245, pl. xiv. fig. 2, A, B) as *Equorea formosa*, n. s.; if this proves to be the case, Greene's specific name will, of course, take precedence.—A. C. H.]

A minute and immature Siphonophore was found in Dalkey Sound, which was doubtfully referred to as *Agalmopsis sarsii*, Köll.

The following are the Sea Anemones recorded:—**Edwardsia* sp. incert., a minute and immature form of a uniform pale pink colour from Salthill; *Halcampa chrysanthellum*, Peach, from Malahide; *Heliactis bellis*, Ellis, Malahide and Dalkey; *H. venusta*, Gosse, vars. *rosea* and *nivea*, Dalkey; *H. miniata*, Gosse,

Dalkey, and off Bray Head in twenty-three fathoms; *Cylista undata*, Müll., Monkstown and Dalkey. One or two specimens of the parasitic Medusa, **Halcampa fultoni*, T. S. Wr., were found on species of *Thaumantias*. Several stages of development were observed, and this parasite will probably prove to be the larval form of *Halcampa chrysanthellum*. *Caryophyllia borealis*, Flem., var. *esmeralda*, was found at Dalkey by Mr. H. W. Jacob.

The following Vermes are recorded:—**Planaria ulvæ*, Oerst.; **Tetrastemma dorsalis*, Abildg.; **T. candida*, Müll.; **T. flavida*, Ehr.; *Lineus marinus*, Mont.; *Amphiporus lactifloreus*, Johnst.; *Tomopteris scolopendra*, Q. & G.; *Sagitta bipunctata*, Krohn; *Pedicellina cernua*, Pall.; *Bowerbankia imbricata*, Ad. (sessile form); **B. caudata*, Hincks; **Diastopora obelia*, Johnst.?; **Scrupocellaria scrupea*, Busk; and **Ætea truncata*, Landsb.

The Mollusca are:—*Eolis drummondi*, Thomp., **E. lineata*, Lov., **E. despecta*, Johnst., **E. exigua*, A. & H.; all from Kingstown. *Protonotus mucroniferus*, A. & H. This last species was discovered by Alder and Hancock at Malahide in September, 1843, and now again in the same place in September, 1885. The only other recorded locality is Lamlash Bay in 1881 (Herdman). Also *Polycera quadrilineata*, Müller, *Eledone cirrhosa*, Lam., and others.

Of the Echinodermata, *Echinocyamus angulatus*, Leske (= *E. pusillus*), off Bray Head in twenty-three fathoms, and *Synapta inhærens*, Müll., found by Messrs. Jacob and Dixon at Malahide, are the only forms not previously recorded for Co. Dublin. [Since writing the paper here quoted I have learned that Dr. Kinahan found several specimens of *S. inhærens* at Sutton, Co. Dublin, about the year 1860, and he exhibited them, with mounted specimens of the skin, at the Dublin Microscopical Club at the time. I have recently seen a slide of the latter, and can vouch for the identification being correct, but, so far as I can learn, no record was made of it at the time or since.—A. C. H.]

All the specimens marked with an asterisk *, so far as can be discovered, have not before been recorded as occurring in Ireland.

VIII. *Note on Halcampa chrysanthellum*, Peach. By A. C. Haddon, Proc. R. Dub. Soc. (N. S.) v. p. 1, figs. 1—4 (1886).

A critical note on this species, the following being synonyms : —*Edwardsia duodecimcirrata*, Sars.; *Xanthiopus bilateralis*, Kef.; *X. vittatus*, Kef.; *Halcampa kefersteini*, Andres; *H. andresii*, Hadd. Several varieties are described, and a new description is given, which takes into account the wide range of variation of the species.

ON THE WOLF OF NIPPON.

BY PROF. NEHRING, OF BERLIN.*

IN reference to the important and suggestive remarks on the Mammalia of Japan and their geographical distribution, recently published by Dr. D. Brauns,† I venture to make some observations on the Wolf found in the Isle of Nippon, reserving some further remarks on a few other species for another occasion.

The Japanese Wolf, as is well known, has been identified by Temminck as *Canis hodophylax*,‡ and is said to differ from the Common Wolf, *Canis lupus*, Linn. (= *Lupus vulgaris*, Gray), by its smaller size, relatively shorter legs, and also by its different colour. Von Schrenck, however, a thoroughly profound critic on the subject,§ upset the distinctive characters pointed out by Temminck, especially demurring to a belief in the existence of any anomalous proportions of the leg-bones. Prof. Brauns, also on the opinion of von Schrenck, declares the Japanese Wolf identical with *Canis lupus*, in opposition to his previously expressed views on the subject.||

Being in possession of a well-preserved skull of a full-grown Japanese Wolf of moderate age, I am in a position to express an independent opinion on the subject. The skull in question belongs to the Anatomical Museum of Berlin (register No. 25,546),

* Translated from the German in 'Der Zoologischer Garten,' 1885, pp. 161—170.

† "On the Geographical Distribution of Mammalia in Japan," in Mitth. d. Ver. f. Erdkunde. Halle-o.-S., 1884.

‡ See Temminck, 'Fauna Japonica,' p. 38, fig.

§ L. von Schrenck, 'Reisen im Amur-Lande,' i. p. 47.

|| In 'Chrysanthemum,' Feb. 1881.

lent to me by Prof. R. Hartmann. The Museum authorities received it in 1877, with some other skulls of Japanese Mammalia collected by Dr. Dönitz in Nippon, although I am unable to state whether he actually procured it himself.

With regard to the cranial bones, their general appearance as well as the condition of the teeth show that this skull undoubtedly belonged to a wild animal, and not to any domesticated one. The profile is prolonged, the forehead being remarkably flat, the parietal crista distinctly and prominently developed in its posterior portion. The malar bones are widely separated, indicating very strong muscles for the purpose of mastication. The upper incisors and the upper premolars are considerably worn, whilst the corresponding teeth of the lower jaw and all the molars present but slight traces of having been used. Without going into a detailed description, I merely wish to state that this skull of a Japanese Wolf is much smaller than some full-grown wild living specimens of the common European Wolf. The total length amounts to 213 mm., the length of the base from the anterior edge of the occipital foramen to the point between the middle incisors only 185 mm.; the upper sectorial tooth has a length of 22.5 mm.; both the upper molars, 23 mm.; the lower sectorial tooth, 25.5 mm. The extreme width of the skull measured across the malar bone is 123 mm.

On comparing these dimensions with those of some typical specimens of *Canis lupus*,* it will be found that they are perceptibly inferior, although I found them to accord somewhat with some full-grown specimens of the Indian Wolf, *Canis pallipes* (= *Lupus pallipes*, Gray). For instance, the sagittal suture in the skull of an old male of the last-mentioned species† measures 214 mm.; the basicranial axis 190 mm.; the width between the zygomatics, 126 mm.; the upper sectorial tooth, 22 mm.; the lower one, 24 mm.; and both the other tuberculated teeth, 22.4 mm. Again, the skull of *Canis pallipes* is somewhat larger than that of the Japanese Wolf, but the dentition is rather more feeble.

* Compare my detailed measurements of the skulls of two wolves (male and female) from Galicia; Sitzgsber. d. Gesell. naturf. Freunde in Berlin, Nov. 18th, 1884.

† Zool. Coll. of the Agricult. College at Berlin, No. 1210 of the Nathusius Collection.

The skull of a male *Canis pallipes* obtained during the travels of Messrs. Schlagintweit Bros., and now in our collection, is of the following dimensions:—Cranial length, 210 mm.; basilar length, 181 mm.; width across the malar bones, 112 mm.; upper sectorial tooth, 21 mm.; both the upper tuberculated teeth, 24·3 mm.; and the lower sectorial tooth, 24·8 mm. A skull of *Canis pallipes* mentioned by Prof. Huxley,* has a sagittal length of 215 mm.; the upper sectorial tooth measuring 21·5 mm., the lower one, 24·5 mm.; and both the upper tuberculated ones, 23 mm. It results from these comparisons that the skull in question of the Japanese Wolf is of about the same size as that of the Indian Wolf, the dentition only being stronger. As regards the shape of the teeth, I find many points of comparison with the Indian Wolf, only the shape of the bullæ osseæ is an anomalous one, for they are more protuberant in the latter, while in the Japanese Wolf they appear to be smaller and flatter. In addition to this the Japanese Wolf has a remarkably flat and narrow frontal bone,† which in the Indian Wolf is distinctly vaulted and has a greater breadth. In general the skull of the Japanese Wolf has, in spite of many analogies with that of the Indian Wolf, more or less a peculiar stamp of its own, and I should be able to pick it out at once from forty other skulls of wolves which I am dealing with.

Temminck, in his 'Fauna Japonica,' states explicitly (p. 39) that the skull of the Japanese Wolf is smaller than that of the European Wolf, pointing out that he had a full-grown specimen in his possession, adding further that Siebold also possessed a very old individual of exactly similar dimensions. These statements agree precisely with the details afforded by the skull in question, and there is no reason to doubt them.‡ That which discredited Temminck's statement, and gave von Schrenck good reason to criticise, was the erroneous description of the "*avant-bras*" or fore arm, called "*radius*," instead of "*radius and ulna*." Properly speaking, there exists no species of the genus *Canis* in which the radius, measured by itself, exceeds the length of the

* "Cranial and Dental Measurements of Wolves of the Old World," Proc. Zool. Soc. London, 1880, p. 279.

† Whether this is the case with all the specimens will be a point for further observation.

‡ I cannot admit that the remarks on the subject by Prof. Brauns are sufficiently confirmed.

tibia; but, as a rule, the fore arm—*i. e.* the radius and ulna, measured together—is generally longer than the tibia, and the variations are by no means so important as von Schrenck considered them.

The following table will justify the facts stated. The measurements were taken from disarticulated skeletons in our collection, in order to get the exact measure of each bone from one extreme end of the joint to the other.

The measurements are given in millimètres.				Greatest Length.			Basilar Length of Skull.
				Ulna.	Radius.	Tibia.	
<i>Canis lupus</i> ,	♂, adult,	Lorraine ...		249	212	228	217
" "	♂, "	Turkey ...		256	217	230	213
" "	♂, "	Finland ...		252	213	231	212
" "	♀, "	Gallicia ...		231	196	216	215
" "	♀, juv.,	Gov. Kaluga		227	193	212	197
" <i>pallipes</i> ,	♂, adult,	India ..		216	185	198	190
" <i>hodophylax</i> ,	"	<i>fide</i> Temm.		202.5*	?	176	(185 ?)†
" <i>dingo</i> ,	♂, "	Australia ...		177	148	166	166
" <i>latrans</i> ,!	♂, "	Mexico ...		182	158	176	162

The conclusion to be drawn from the foregoing table, which, without difficulty, might have been increased fivefold, is that in wolves and wolf-like *Canidæ*, the tibia is always longer than the radius, † but the ulna, which is very nearly the length of the fore arm, always happens to be longer than the tibia. It appears evident that Temminck, in his account of the length of the "*avant-bras*," measured the ulna and radius, adding by some mistake the words *ou le radius* to the "*avant-bras*," instead of naming either both bones of the fore arm, or the ulna by itself.

Assuming this to be the case, we have a normal proportion between the fore part of the arm and the fore part of the leg, in the case of the European Wolf examined by him, consequently we may accept the measurements given of the Japanese Wolf without hesitation. Yet the ulna (*avant-bras*) appears to be somewhat long in comparison with the tibia;

* Properly speaking, this is the length of ulna and radius, which alters very little.

† Interrogatively added for the skull in question.

‡ Compare the notes of L. v. Schrenck.

but this anomalous proportion in the above-mentioned wolves does not appear to be very important; either it is actually the case with the Japanese Wolf, or is to be explained by the fact that Temminck did not measure the bones in a disarticulated and clean condition.

It is impossible to obtain exact measurements from a natural skeleton with the ligaments or portions of them still attached. According to Temminck's notes, the legs of the Japanese Wolf being relatively shorter than those of its congener, it may be said that there is no check upon the length of the skull, which is omitted; yet it may be reasonably assumed that the skull of the specimen measured by him was of similar dimensions to that now lying before me. None of the wolves above mentioned has such a short tibia in comparison with the basilar length of skull.

In accordance with this are the conclusions of Prof. von Martens on the "Yama-ino," not from personal examination, but based upon Japanese pictures. In the zoological part of the 'Prussian Expedition to East Asia' (vol. i. p. 76), he says, "The Yama-ino is distinguished by its shorter legs, and therefore smaller size, and is the same species as that figured in the 'Fauna Japonica.'"

More important are the observations on Japanese Wolves by Mr. H. Pryer, of Yokohama, published in the 'Proceedings of the Zoological Society of London,' 1878 (pp. 115 and 788). Mr. Pryer there announced his having forwarded "a fine specimen of the Japanese Wild Dog" to the Zoological Society of London, and stated that he was endeavouring to acquire a live specimen of *Canis hodophylax*, thus distinguishing the Wolf of the Main-Isle (Nippon), which he names *Canis hodophylax*, from the Wolf of the Isle of Yesso, identical with the Siberian Wolf, *Canis lupus*. He further remarks that *Canis hodophylax* is confined to the main island, and has a shorter muzzle than the Wolf of Yesso. Equally noteworthy is the opinion of Dr. Sclater on a living specimen of *Canis hodophylax*, presented to the Zoological Gardens of London by Mr. Heywood Jones. He says (p. 788):—"Judging from the present specimen of the Japanese Wolf, although nearly allied to *Canis lupus*, it would seem to be a distinct species, recognisable by its smaller size and shorter legs." In reply to further inquiries, Dr. Sclater briefly confirmed the above statement.

Taking all these criticisms into consideration, the result seems to be that the Wolf of Nippon,* known as *Canis hodophylax*, is a specialized form distinguishable from *Canis lupus* by its smaller size and shorter legs, as well as by certain peculiarities in the dentition; at the same time being more closely allied to the Indian Wolf, *Canis pallipes*, by the size of its skull and the shape of its teeth.

Yet on the Island of Yesso the true *Canis lupus* is generally distributed, as appears from Mr. Pryer's communication above referred to, and assuming that Prof. Brauns based his examination of Japanese wolves on specimens originating from Yesso,† his positive assertion of the identity of the Japanese Wolf with *Canis lupus* is thus fully explained. I am not aware whether Prof. Brauns has obtained specimens from the main island for examination. So far as I can see, he gives no notes of the dimensions of the skulls and skeletons. All the arguments summarised by me point to a separation of the Wolf of the main island from *Canis lupus*, and an alliance to *Canis pallipes*. I am therefore unable to agree with the opinion of Prof. Brauns that there "Certainly exists but one species of Wolf in the whole of Japan, *Canis lupus*, which is generally called *Ookami* by the natives, meaning "great spirit," sometimes also *Yamaimi*,—i. e., "mountain dog" or "wild dog,"—and that all allusions to the existence of two species of wolves in Japan are attributable to the fact that the Japanese names for the Wolf are naturally enough bestowed on the Wild Dog, with which it is confounded. To me it seems rather that the existence of two species (or races) of Wolf, as affirmed by the natives, is no imagination, or resulting from confusion of a Wolf with a dog running wild. I purposely say dogs running wild or undomesticated; for if Prof. Brauns' expression "Wild Dog" be understood in its true sense,—that is to say, in the sense of an indigenous wild species of dog referable to the *Yamaimi*,—then I do not object, for it would be a mere contention about words to consider the *Canis hodophylax* as a small species of Wolf or else

* According to Prof. Brauns, it is also found in the Southern Island of Japan.

† Perhaps on skins which, according to Prof. Brauns, are exported in considerable quantities from the Isle of Yesso, where this Wolf is very common.

as a true species of Wild Dog. In either case we should have to contend for two wild species of *Canidæ* in Japan, viz., the large Wolf of Japan and the small one (or Wild Dog) of Nippon.

Moreover, we have the statement of Prof. von Martens, who vouches for the existence of two species of Wolf in Japan. "I myself," he says, "have seen neither the Wolf nor the Wild Dog of Japan, but I am able to state, from the depositions of my Japanese servant, and from his explanation of some illustrated Japanese books at hand, that the natives distinguish two kinds of these animals, the one named *Yama-ino* (Wild Dog), the other *Oo-kami*. The latter, said to be more terrible and voracious, is represented in sculptures with horribly wide-opened jaws, and a human skull near it. The *Yama-ino* is distinguished by its shorter legs and smaller size," &c.

From this it seems to me that the *Ookami* is the larger and more dangerous *Canis lupus*, dispersed over Yesso, and the *Yama-ino* the smaller and feebler *Canis hodophylax*, living in the main South Island. Prof. Brauns also asserts that *Ookami* properly means the Wolf: a mistake if in the 'Fauna Japonica' this name was identified with "une espèce intermédiaire entre le chien de chasse et le loup," such a species having no existence.

Comparing the affinities of the Japanese dogs living in a wild state with the Wolf of Nippon, I propose to publish my views in a separate treatise, having considerable material in the shape of skulls of these dogs. For the present my intention is merely to summarise the reasons which induce a separation of the small Japanese Wolf from *Canis lupus*. Whether it is to be considered a distinct species of the genus *Canis* or a well-marked race of *Canis lupus* is simply a matter of opinion. To my mind all recent and fossil species of *Canidæ* are closely united by slight and exceedingly varied modifications, which render it difficult to separate them specifically according to the old notion of species, showing as they do a significant tendency to variation and to the formation of local races.

Prof. Huxley, in his excellent paper on the characters of skulls and dentition of *Canidæ*,* remarks that "The existing *Canidæ* exhibit a gradual series of modifications in the form and size of their skulls and the number and characters of their teeth,

* Proc. Zool. Soc. 1880, p. 284.

from *Octocyon*, as the least differentiated member of the group to the Wolves, Lycaons, Cyons, and Northern Foxes, as the most modified forms." And in the course of his remarks on the limits of species he expresses the following opinion:—"As for species no one zoologist has ever yet agreed with the estimate of another as to what should be considered species and what local varieties among Wolves and Foxes; and, as there is no criterion by which the question can be decided, it is probable that such agreement never will be obtained. The suggestion that it may be as well to give up the attempt to define species, and to content oneself with recording the varieties of pelage and stature which accompany a definable type of skeletal and dental structure in the geographical district in which the latter is indigenous, may be regarded as revolutionary; but I am inclined to think that sooner or later we shall have to adopt it."

Although agreeing with this view of Prof. Huxley, I am nevertheless inclined to think it advisable to bestow specific names on distinctly prominent and local forms, whether species or races. Thus the small Wolf of Nippon should have a special scientific designation.

Unfortunately the name applied by Temminck to this animal is not a very suitable one, as Prof. von Martens rightly observes.* It would do well enough for those Japanese dogs which live in a wild state, but is not appropriate for a Wolf, which, according to Temminck, "lives in the wooded and mountainous regions of that island, avoiding the inhabited parts." The orthography also varies in Temminck's work between *hodophylax*, *hodopylax*, and *hodophile* (*hodophilus*), with remarkable inconsistency. In view of this I beg to propose another name (instead of that unsuitable one) for the small Wolf of Japan, *Lupus japonicus*, to distinguish it on the one hand from *Lupus vulgaris* (Gray), and on the other from *Lupus pallipes* (Gray). In case it should be deemed better to retain the old specific name *Canis lupus*, characterizing the small Wolf of Nippon as merely a local race of it, it might be well to call it *Canis lupus* var. *japonicus*. As regards the probable origin of the Wolf of Nippon, it appears to me that two hypotheses may be considered—namely, that it is either a local

* Temminck's name *hodophylax*, from ὁδοφύλαξ, a watcher of the roads, a robber, seems to us a remarkably appropriate one for a Wolf.—ED.

race, which, from the insular nature of Nippon has developed into a peculiar form; or else that it appeared as an already distinct form from South-West Korea, extending as far as the Tsugaru Strait. Which of these two hypotheses is likely to be the right one may be a matter for further consideration. Perhaps both should be simultaneously considered.

It would be very desirable to purchase further material, in the shape of skins and skeletons of *Lupus japonicus* for our Museums, if possible from the South Island (Kinsin). In view of the frequent communication which exists between Europe and Japan, this ought not to be a difficult matter.

NOTES ON THE VERTEBRATE ANIMALS OF LEICESTERSHIRE.

BY MONTAGU BROWNE, F.Z.S.

Curator, Town Museum, Leicester.

(Continued from vol. ix., p. 467.)

Fam. STURNIDÆ.

Sturnus vulgaris, Linn. Starling. — Resident and commonly distributed; breeding, even in the town of Leicester. I saw many of these birds nesting in boxes in trees opposite the hall-door at Mr. W. Whitaker's, of Wistow, in May, 1885. One box, which was tenanted, was not more than ten feet from the ground. It is subject to variety. Davenport records a white one seen by him at Skeffington in September, 1878.

Pastor roseus (Linn.) Rose-coloured Pastor. — This species is inserted on the authority of Mr. Macaulay, who states ('Midland Naturalist,' 1882, p. 63) that one was seen near Foxton, about 1870, by the Rev. H. Matthews. It was in the company of a flock of Starlings. Since then, Turner has told me that a man named Collins, now deceased, received a specimen in the flesh from Enderby ten or more years ago.

Fam. CORVIDÆ.

Garrulus glandarius (Linn.). Jay. — Resident and generally distributed; breeding in various parts of the county. Davenport finds their nests and eggs every year.

Pica rustica (Scopoli). Magpie.—Resident, generally distributed, and breeding. Subject to variation of colouring. Davenport writes, “A white Magpie frequented the neighbourhood of Shearsby for a long time in the winter of 1881-2, and was seen by many people.” He adds, “A Magpie begins to build, say, at the end of March, and takes about a month to complete her nest; let the eggs be taken, one week will suffice for the rearing of a second nest.” Mr. J. W. Whitaker, of Mansfield, Notts, writes me that his brother, W. Whitaker, of Wistow Grange, shot a cream-coloured variety in 1880, and threw it away as of no value! He purchased in 1882 a snuff-coloured variety of the Magpie, said by the man who sold it to have been taken at Stoughton.

Corvus monedula, Linn. Jackdaw. — Resident, commonly distributed, and breeding in old steeples, &c., in the town of Leicester. Harley observed a pair nesting in the chimney of a small cottage standing beside the lane leading from Newtown Linford to Ulverscroft. Davenport reports a variety of the eggs taken by him in Launde Wood in 1881. Ingram tells me the Jackdaw harries Blackbirds’ nests, and has no scruple in taking the callow young.

Corvus corone, Linn. Carrion Crow. — Resident, generally distributed, and breeding, but by no means common. Harley states that, “On the large grass lands in the southern division of the county, where game is much less cared for than in other districts, the Carrion Crow is certainly more abundant and more frequently met with.” Davenport writes, “A very small dark green egg was taken (from a nest containing one other) by me near Rolleston in April, 1882; a precisely similar egg in every respect was taken near Rolleston in April, 1883, from a nest containing four others. Both eggs are in my collection. The old birds had frequented the neighbourhood during the intervening winter.”

Corvus cornix, Linn. Hooded Crow; “Grey Crow.”—An uncommon winter visitant. It is mentioned in Potter’s ‘History of Charnwood Forest’ as having been seen near Charnwood Heath. Specimens are said to have been killed near Leicester. Harley says, “It is very sparingly distributed over Leicestershire, and chiefly limited in its range to the Forest of Charnwood and the surrounding district.” Ingram writes, “Five or six pairs generally visit Belvoir every November, remaining until spring; often near

the kennels, the smell of flesh attracting them. They do not remain to breed." Macaulay reports one obtained at Skeffington in 1875, and again in December, 1880. He also informed me of one seen by him at Saddington Reservoir, Jan. 7th, 1885. I obtained one from Rothley Plain on Feb. 2nd, 1881, and another, also in the flesh, on January 3rd, 1882, shot close to Leicester, both of which were purchased for the Museum. The late Mr. Widdowson informed me that these birds appeared in the vicinity of Melton nearly every winter. Mr. Ellis says that he sees a pair or two nearly every winter, and I myself, when driving near Bradgate, saw two on February 24th, 1882, sitting on an old tree. Elkington tells me (October, 1885) that he has in past years received several from Swithland. Turner reports one shot some fifteen years ago in the Abbey meadow, and the 'Leicester Chronicle and Mercury' of October 24th, 1885, records that a Mr. Bevin, of Dunton Bassett, found a wounded bird of this species there on October 16th, 1885. Since then it appears to have been unusually common. I purchased a male shot Cropston Road, October 31st, the stomach of which contained large quantities of the elytra of various beetles, and some few uninjured small snails. Another, a female, was shot at Cossington on Nov. 6th, and presented to the Museum by Mr. Thomas Woodcock, of Ratcliffe-on-the-Wreake; five others were seen near there on the 5th; one shot at Narborough by Mr. Everard about the same time. Mr. Davenport reports three seen at Skeffington on Dec. 5th; Rev. A. Matthews saw two at Gumley, and Mr. W. J. Horn shot one at Uppingham, Dec. 5th, and reports them to be quite common in that district.

Corvus frugilegus, Linn. Rook.—Resident, commonly distributed, and breeding in "rookeries" so close to the town of Leicester as Westcotes, Stoneygate, and Knighton. This bird is subject to much variety. The MS. Donation Book, Leicester Town Museum, records under date June 13th, 1850, a rather uncommon variety, "of a pale brown colour, shot at Stoneygate"; and under date May 25th, 1885, a pied specimen from Gopsall, and one with white wings from Belvoir was presented on June 24th, 1880, by Mr. Theodore Walker. I saw an immature bird shot at Wistow Park, May 20th, 1885, the beak of which was yellowish white, claws white, several of the toes barred with white, part of the head and chin white, as also several of the primaries and secondaries.

Corvus corax, Linn. Raven. — Rare. Has not occurred for years. In Potter's 'History of Charnwood Forest' it is stated that the Raven was "generally to be seen on Sharpley a few years since; still in Bradgate Park, as I learn from Mr. Bloxam." Harley states that a Raven reared its young at Garendon in 1825. He adds that the late Mr. Adams assured him that the Raven had entirely deserted Bradgate Park. It was met with at Sharpley Rocks in October, 1848. In the 'Midland Naturalist,' 1882 (p. 64) Macaulay reports one shot at Saddington many years since, while feeding on a portion of a sheep that had been hung up in a plantation, and another at Rothley, February 17th, 1881. This last is, however, an error; Macaulay's informant being incompetent to distinguish a Raven from a Carrion Crow. The late Mr. Widdowson wrote me that Mr. John Brown, of Oakham, had one or two that were taken out of a nest in Cottesmore Park, near Oakham, some years ago.

Fam. ALAUDIDÆ.

Alauda arvensis, Linn. Sky Lark.—Resident, commonly distributed, and breeding in fields close to the town of Leicester. Packs in flocks of many hundreds in winter. The MS. Donation Book, Leicester Museum, records a black variety from Belgrave, March 31st, 1860.

Alauda arborea, Linn. Wood Lark.—Resident, but not common. Harley says it is seldom met with, except in the more retired woodlands. Around Newtown Linford, Groby, and neighbouring districts the Wood Lark occurs, but even in such places it is not abundant. It builds on the ground in corn-fields, and rough places near the sides of thick woods and plantations. Never congregates in the winter months, like the Sky Lark, but remains solitary. I have not received it myself as yet, although both Elkington and Turner receive specimens occasionally, agreeing, however, that it is much rarer than formerly.

Order PICARIÆ.—Fam. CYPSELIDÆ.

Cypselus apus (Linn.). Swift; "Devilin." — A summer migrant; commonly distributed. Harley says, "With us this species nests in holes in old walls, and in the roofs of dwelling-houses and out-buildings. None of the churches in Leicester with which I am acquainted appear to have a colony of Swifts,

the ugly roofs of the buildings not being at all favourable to the habits of the birds; and further, ever since I paid any attention to the manners of this bird I have never been more surprised at its temporary withdrawal than during August, 1848." On the 16th the Swifts withdrew, apparently altogether, where only a few days before the birds were abundant; but on the 24th, 25th, and 26th numbers returned in my own parish and at a small village hard by.

Cypselus melba (Linn.). White-bellied Swift; "Alpine Swift." —A rare summer migrant. Has been quoted in nearly every work since 1839 as having occurred in Leicestershire, on the authority of Macgillivray (Brit. Birds, iii., p. 613), which, with Harley's MSS. to guide me, appears insufficient, the bird having only been seen flying overhead, at some considerable distance from the ground. Mr. Harting, at page 201 of 'Our Summer Migrants,' allows it to be inferred that the above specimen (mentioned at p. 200) was shot.

Fam. CAPRIMULGIDÆ.

Caprimulgus europæus, Linn. Nightjar; "Goatsucker;" "Fern Owl." —A summer migrant, sparingly distributed, but doubtless breeding occasionally. Harley records it from Bardon, Oakley, Gopsall, Martenshaw, and Gracedieu. The MS. Donation Book, Leicester Museum, records one from Ashby-de-la-Zouch, September 2nd, 1874: one, Birstall, September 3rd, 1876; one, Belgrave, May 26th, 1877. The late Mr. Widdowson wrote from Melton, "Very few about here." Mr. Ingram writes, "Found every summer in Belvoir Woods, but less numerous than formerly; have not found its eggs." Mr. T. B. Ellis writes, "Rare, one or two generally at 'The Brand.'"

Fam. PICIDÆ.

Dendrocopus major (Linn.). Great Spotted Woodpecker; "French Magpie." — Resident, but not common, breeding occasionally. In Potter's 'History of Charnwood Forest' it is said to be "found in old woods all round the Forest, but is not very common." Harley says, "The species is seldom seen, except in the vicinity of the parks of Garendon, Donington, Beaumanor, Gopsal, and Bosworth." Sir G. Beaumont wrote to Mr. Macaulay that he had seen it at Coleorton. The Rev. A.

Matthews got a female bird of this species at Gunley in Nov., 1864; and Mr. Davenport informs me that one was killed at Loddington in 1881, and that he saw a pair in May, 1881, in Loddington Redditch, and one in November, 1883, in Nosely Park. Mr. Ingram writes, "Occurs in the Belvoir Woods, and breeds occasionally; seen in orchards; a shy bird." Widdowson wrote, "Occurs most years about neighbourhood of Melton." I bought a female Great Spotted Woodpecker, said to have been procured from Ansty in the autumn of 1883; and have seen a fine male, shot by the late Mr. Wm. Sansome in the vicinity of Narborough some fifty or sixty years ago. Mr. T. B. Ellis writes, "Frequents the larger woods; one or two pairs frequent Bardon Wood"; and, as a proof of this, a fine male specimen was shot by the keeper at Bardon Hill on May 15th, 1885, and presented to the Museum by Mr. B. N. Everard.

Dendrocopus minor (Linn.). Lesser Spotted Woodpecker.—An uncommon resident; breeding occasionally. It is included amongst the birds of Charnwood Forest as having occurred near Groby. Harley says, "Near to Leicester it affects the elms standing on the grounds at Dannett's Hall and Westcotes; and near to the town of Loughborough is known to haunt the trees at Burleigh Fields, and also at Market Bosworth." Mr. Macaulay writes, "Still rarer than the last-named. In the summer of 1878 a pair built in an orchard at Gumley, and hatched off on May 26th; but (unfortunately) the young were destroyed, and the old bird captured." Mr. Davenport reports it as "building at Rolleston," and he obtained a male in Cold Overton Wood in January, 1884. The late Mr. Widdowson wrote, "Last winter (1883) a pair frequented Lord Wilton's Park all the winter, but did not remain to breed." Elkington told me of one procured at Woodhouse Eaves in 1883, and I purchased from him a female bird, shot at Humberstone on Dec. 19th, 1885.

Gecinus viridis (Linn.). Green Woodpecker; "Yaffle;" "Rain-bird."—Resident, and generally distributed. I have procured specimens from Ansty, Bradgate, Cropston, Kibworth, &c.; and Davenport writes, "I found on May 13th, 1885, a Green Woodpecker's nest at Keythorpe, in a small hole in a tree not three feet from the ground. On enlarging it (in no very careful manner) I found nothing in it. Passing by on the 18th, to my amazement the bird flew out again; this time there were five eggs; by the

22nd four more were laid; on the 27th, two; and on June 3rd, three; making a total of fourteen!"

Jynx torquilla (Linn.). Wryneck; "Cuckoo's Mate;" "Snake-bird."—A summer migrant, sparingly distributed, and becoming less common than formerly. Harley says, "The Wryneck nests with us, breeding in holes in orchard and forest trees. It appears nowhere more common than around Foxton. The ash prevails there, and, moreover, ant-hillocks abound to a much greater extent than in any other district known to us." According to Mr. Macaulay ('Midland Naturalist,' 1881, p. 255), a pair built that year in a garden at Kibworth, and were not disturbed.

Fam. ALCEDINIDÆ.

Alcedo ispida, Linn. Kingfisher. — Resident, and generally distributed. Elkington reports several from the vicinity of Leicester during the winter of 1884-5. I have repeatedly observed specimens on the brook at Knighton, and on the Soar at Aylestone. It has, I believe, bred at Bradgate, Blaby, Bosworth, Desford, Stapleford Park, &c.; and on May 22nd, 1885, Master George Snoad presented to the Museum four fresh eggs,—being part of a clutch of nine,—taken from a hole in a clay-bank by a little pond close to the Aylestone Road, at some distance from the river. The eggs, laid upon fish-bones, were, before being blown, of a delicate pink hue.

Fam. UPUPIDÆ.

Upupa epops, Linn. Hoopoe. — An occasional spring and autumn visitant. The first notice I can find of this bird is contained in the catalogue of the contents of the Museum, when handed over by the Literary and Philosophical Society to the Corporation of Leicester on June 19th, 1849:—"1 *Upupa epops*, shot in Leicestershire." Harley writes, "This species has occurred in the county in immature plumage, a fine example having been shot in the lordship of Stapleton on September 15th, 1851. This was presented by him to the Town Museum, where it is still preserved (1885). The Hoopoe is said to have occurred also at Bradgate Park, and near Lutterworth. The MS. Donation Book, Leicester Town Museum, records the presentation on June 26th, 1867, by Mr. C. Burdett, of another example (still in existence) "shot in the county of Leicester." I saw a very fine

one, apparently a male, of a deep buffy pink and pure white and black, resembling the most richly-coloured South European specimens (of which I have shot many), in the hands of Elkington. It had only been that day set up, and was shot at Great Peatling on May 11th, 1883, by Master Hall, of that place. Mr. W. A. Vice, M.B., has told me since then that another one was in its company.

Fam. CUCULIDÆ.

Cuculus canorus, Linn. Cuckoo. — A summer migrant, generally distributed, and laying its eggs in other birds' nests as close to Leicester as at Aylestone and Knighton. Harley remarks that, although it chooses a foster-mother to hatch its egg or eggs, "yet when its offspring comes abroad on wing" he has "noticed its anxiety to provide for the same, much in the manner of other birds," and gives an example proving this. He remarks also that "it is liable to albinism," but this I cannot confirm. The Rev. A. Matthews, of Gumley, wrote in 'The Zoologist,' January, 1885, p. 25, relative to an immature male found on July 12th, apparently killed by flying against a tent-rope in the garden, and he argues therefrom that the bird was migrating during the night. With all deference to my friend's opinion, I would contend that the date is early for migration (a young bird was killed with a stone at "Forest Rock," August 8th, 1882); and, secondly, that there is no evidence that it was not killed in the early morning during ordinary flight, as the late Mr. R. Widdowson wrote to me. "Last spring (1883) I had four brought to me in one week, all killed by flying against windows." Mr. Davenport writes, "Found an egg in the nest of a Sedge Warbler in a small plantation near Ashlands in June, 1883. The Cuckoo flew and settled on the nest, and remained there quite fifteen minutes." Mr. Macaulay reports, "April, 1881, Cuckoo in Wagtail's nest at Saddington." Ingram writes, "Becoming more numerous; the Wagtail, its favourite foster-mother, often rears the young in the precincts of the garden at Belvoir." Mr. John Ryder, lodge-keeper at Belvoir Castle, informed me that in the spring of 1884 a Cuckoo laid an egg in a Robin's nest built in a bank by the lodge, and the young Cuckoo was reared by the Robins. On June 28th, 1883, I went to see a young Cuckoo in a Hedgesparrow's nest, built in some sticks amidst a thick growth of nettles and thistles, not more than

twenty yards from the back door of Mr. Wm. Lander's farmhouse at Knighton. The young usurper, at my approach, ruffled its feathers and drew back its head, and then darted out its neck with the most threatening gestures, uttering at the same time a sharp hiss; indeed its actions, though ludicrous to a degree, were a remarkably good imitation of those of a snake. I found an unbroken egg of the Hedgesparrow just outside the nest, and saw that the foster-mother fed her ugly charge with larvæ, chiefly of sawflies. The identical group is now in the Museum. Mr. Wilson, of Aylestone Mill, found in July, 1885, a young Cuckoo in a Reed Warbler's nest built by the side of the river, not twenty-five yards from the Aylestone Road tramway.

(To be continued.)

NOTES AND QUERIES.

Marine Biological Association.—We are sure zoologists generally will hear with satisfaction of the recent decision of the Treasury with regard to this excellent institution. Their Lordships have determined to submit to the House of Commons an estimate by which the Association will receive £5000 in two annual instalments, and thereafter £500 a year for five years. The conditions attached to this grant appear to be altogether such as the guardians of the public purse may well enforce, and we understand that they have all been acceded to by the Council. At the same time it is to be understood that the Association still stands in need of funds, and that, although its work will shortly be commenced, it remains for future benefactors to strengthen and widen it. With the New Year Mr. Walter Heape, M.A., who has been for some time Demonstrator in Animal Morphology at Cambridge, will enter on his duties as Resident Superintendent at the Marine Laboratory at Plymouth.

MAMMALIA.

Habits of the Squirrel.—In his description of the Starlings and Sparrows squabbling over the eggs on his lawn (Zool. 1885, pp. 431, 432), the Rev. J. C. Atkinson appears to attribute the removal and destruction of the eggs of *Picus major*, described by me in the same volume (p. 229), to the proprietors of the nest themselves, or to other birds of the same species. Or does he accuse the Sparrows and Starlings of the robbery? I cannot quite understand his meaning; the only point on which I feel sure is that he repudiates the idea of a Squirrel committing such an atrocity, and treats my theory with disdain. The question is an inte-

resting one, however, apart from this one disputed case, and I am pleased to be able to produce some further evidence in support of my views, which may perhaps have a more convincing effect on the tender-hearted champion of the Squirrel. As regards the nest of *Picus major*, I have only to add that there are unfortunately very few pairs of this Woodpecker in the locality,—far too few for jealous squabbling over their eggs,—while there are no Sparrows and hardly any Starlings nesting in the immediate vicinity of the particular tree. It can scarcely be considered a difficult feat for the Squirrel to carry out the “practical joke” of removing eggs from such a nest, only nine inches below a comparatively large entrance hole. No one who has kept, or even carefully observed, a tame Squirrel, and has seen the extraordinary way in which he can force himself through a small aperture, would be the least astonished thereat. From the information in my possession I will make the following extracts:—Col. George Sullivan, of Warmwell, near Dorchester, writes—“I look upon a Squirrel as a very destructive animal amongst eggs, and anyone who contradicts this statement shows his ignorance. I knew of a Pheasant’s nest in a rose-bed close to our drawing-room window; it had fifteen eggs, and my father, who was laid up with gout, and always laid on the sofa by the window during the day, seeing a Squirrel constantly going from a fir tree covered with ivy to the rose-bed, asked me to see if the nest was all right. I did so, and found all the eggs gone. He then ordered the gardeners to get a long ladder and examine the tree up which the Squirrel always went, which was done, and the shells of the eggs were found in an old nest, after which all Squirrels were ordered to be killed. Again, I had when at Broke Hall a pair of tame Doves, and they had a nest in a tree close to the hall. One day I saw the Doves in a great state, and went to see what was wrong, when I saw my friend the Squirrel. Needless to say, I got my gun and shot him; he had destroyed the nest. Squirrels will also destroy young Wood Pigeons by biting them and throwing them out of the nest; I have picked up numbers thus killed, and have baited traps with them and caught the brutes.” Lord Lilford informs me:—“A tame Squirrel that I kept years ago was exceedingly fond of birds’ eggs; of course it is an acquired taste, but I feel no doubt whatever that Wood Pigeons are the principal sufferers from it.” One of Lord Lilford’s keepers, H. Cook, told me that he watched a Squirrel in the act of sucking a nest of four Thrush’s eggs in the Lynch Wood at Lilford, two years ago. He waited a moment or two before going up to the nest and disturbing the animal, which had made a hole in the eggs and sucked the contents. Mr. Charles Radclyffe, of Hyde, near Wareham, informs me that he has frequently seen Squirrels coming down trees from Wood Pigeons’ nests with the eggs in their mouths and going up other trees with them. He is not sure if they carried them unbroken, or put their teeth into them to hold them

better. He has seen one crossing a meadow near his house with an egg in its mouth. Lightfoot, Mr. Radclyffe's head keeper, a most reliable man, tells me he has repeatedly seen them carrying off hen's eggs from outlying nests. Though I have somewhere read of their doing this before, I have never previously come across an eye-witness of the feat. All my questions failed to shake his evidence, and he laughed at the idea of anyone doubting the egg-stealing propensities of a Squirrel. The above facts are, I venture to think, tolerably conclusive. In addition, I have testimonies from all sides to the frequent capture of Squirrels in traps set for Jays, &c., baited with birds' eggs; but this is too well-known an occurrence to be of much weight in conjunction with such evidence as that already adduced. I hope the subject will not be allowed to drop, and that others may contribute the result of their observation and experience to the discussion; for however admirable and excellent the Squirrel may be from what I may term an "æsthetic" point of view, there seem to me the gravest reasons for withholding from him the support of the lover of birds and the sportsman, as well as that of the forester.—S. G. REID (Capt., late R.E.).

Food of the Common Shrew.—During last April my brother, having found the pupa of some large moth, placed it for the time being on the window-sill outside. Sometime afterwards, while indoors and looking out of the window, he saw a Shrew come up to it, seize and carry it off. The window is rather low, and is partly surrounded by the branches of a large old pear tree. A few years ago I caught several specimens of the Common Shrew, *Sorex tetragonurus*, in a meadow in which were a good many patches of more or less dry cow-dung, many of which had been tunnelled in various directions by these little animals, doubtless in their search for the grubs which usually occur in such situations.—G. T. ROPE (Blaxhall, Suffolk).

BIRDS.

American Golden Plover and Richard's Pipit in Scotland.—I wish to record, through the medium of your pages, the occurrence in Scotland of two rare birds in my collection which have not been previously recorded—namely, the American Golden Plover, *Charadrius virginicus*, and Richard's Pipit, *Anthus Ricardi*. The circumstances under which the American Golden Plover was obtained are as follows:—On August 3rd, 1883, Mr. P. D. Malloch, fishing-tackle maker, of Perth, was walking near Perth, when the bird in question crossed the road in front of him; he fired and killed it, and, thinking it a pretty bright specimen in change of plumage, took it into his shop next day, mounted it, and put it in his window. I happened to come in two days after, and as I wanted a Golden Plover just beginning to lose the summer plumage I told him to convert it into a skin for me, which accordingly he did. On the 10th of October last I happened to be staying with Mr. Harvie Brown, and there I met Mr.

Bidwell, who in the course of conversation informed me that he had first discovered the Asiatic Golden Plover in this country, remarking that one of the distinguishing features of the latter bird was its having brownish grey instead of white axillaries. On my return to London, when looking over my series of Plovers, I was surprised to find the specimen in question was grey under the wings. On comparing it with specimens of *Charadrius pluvialis* I found it differed in other respects, the colouring being richer, and spots on the wing more boldly marked, and the bird altogether smaller; the wing measures 7·2 inches, and from the end of the innermost secondaries to end of primaries, 1½ inch in length. I of course thought it was the Asiatic Golden Plover, but on showing it to Mr. Bidwell, Mr. Gurney, and Mr. Seebohm, they were all of opinion that it was *Charadrius virginicus*. The Richard's Pipit, *Anthus Ricardi*, I shot myself on August 2nd, 1880, at Dalguise, a small village about seven miles north of Dunkeld. I used to go every year and shoot young Oystercatchers and Curlews along the Tay, on the island opposite Dalguise House, where they breed in large numbers; and to reach the river from the road it is necessary to follow a small brook and climb a paling. There were always numbers of Meadow Pipits there, and that day proved no exception; but sitting amongst them was a bird which I at first took to be a Lark, but standing so high on its legs I thought it seemed rather curious, so I shot it, and having skinned it, put it in my collection amongst my Larks, not knowing then that there was such a bird as Richard's Pipit.—J. GUILLE MILLAIS (2, Palace Gate, W.).

Recent Occurrence of the Sea Eagle in Kent.—The recent occurrence on two occasions of the Sea Eagle, *Haliaeetus albicilla*, in Kent, no doubt whilst on their southern migration, is a matter of much interest. Both specimens are young birds; one, a female, shot at Minster, early in November, is described by a local ornithologist who examined it as measuring 3 ft. 1 in. in length, with an expanse of wings of 8 ft., and weighing 10 lbs. The second bird, a young male, shot at Eastwell Park, is smaller than the other, and perhaps related to it, differing also in having the neck-feathers of a rich dark brown, instead of the grey-tipped feathers of the female. I send you photographs of both. It appears that a third Eagle, perhaps of the same species, has lately been observed in the same county, on the property of Mr. W. Erle-Drax, at Olantigh Towers, though all attempts to secure it have so far fortunately been unsuccessful.—PERCY E. COOMBE (23, Carlyle Square, S.W.).

[We are much obliged for the photographs, which have duly reached us. They show clearly that both the birds are young Sea Eagles, and not Golden Eagles, as recently stated in some of the daily papers.—ED.]

Woodchat and Serin Finch in Norfolk.—On May 16th I received, in the flesh, from Mr. G. Smith, of Yarmouth, a male Woodchat, *Lanius rufus*,

I hear that several others were obtained on the East Coast further north. From the same source I also had a Serin Finch, *Serinus hortulanus*, shot in the Apollo Gardens, Yarmouth, June 14th. Unfortunately the specimen was so riddled with shot that proper identification of the sex was impossible, but from the plumage it was no doubt a male. This, I believe, is the first occurrence of this species in Norfolk, and will be a welcome addition to the already rich avifauna of that county.—R. W. CHASE (Edgbaston, Birmingham).

FISHES.

Habits of the Holibut.—On my passage down the coast of Norway last autumn we put in (among the numerous other places), on the morning of October 15th, to Stoksund (about N. lat. $64^{\circ} 5'$). This little station is completely land-locked, and the sea was as smooth as a mill-pond, without the slightest ripple. Presently the evenness of the surface was broken by the nose of a large fish appearing above it, and then, with a splash, appeared an enormous tail. This was continually repeated, and by degrees we made out that there were two noses and two tails, and that they belonged to two Holibuts (one being very large). They swam close past us, so that we saw a good deal of them; they appeared to be playing, much as two Seals or Otters might do, and enjoying the sunshine, the first we had had for ten days. This habit of the Holibut to come up from the depths with which one usually associates them (we were in twenty fathoms water at the time) was well known to such of the ship's company as were old fishing hands, but was a startling novelty to the purely sailor portion, as it was to myself, and will be, I think, to many readers of 'The Zoologist.'—A. H. COCKS (Great Marlow).

[The Holibut, *Hippoglossus vulgaris*, is the largest of the family of Flat-fishes. It is rarely that one more than five feet long reaches the London market, but one sent to Edinburgh from the Isle of Man weighed 320 lbs., and measured 7 ft. 6 in. by 3 ft. 6 in. On the coasts of Iceland, Greenland, and Newfoundland they attain a much larger size, and specimens have been occasionally captured which reached 20 ft. in length. On the Norwegian coast the fishery is carried on in spring when the nights are clear, so that the fish may be seen on the bottom.—ED.]

Food of the Rays.—All the Rays are constantly found to feed much on sand-eels whenever they can obtain them, and on the flowing tide come into quite shallow water in quest of them on the flat sandy beaches all round the coast, constantly frequented by sand-eels in more or less abundance. On one occasion, having baited a trot or long-line with sand-eels, and shot it at low water on the sands of Whitsand Bay, six miles from Plymouth, out of thirty-eight hooks I found at the next low water eleven hooks occupied by Rays of good size, making altogether so considerable a weight that I found it more convenient to send down a horse and sledge-box

to draw them up the zigzag cliff path than remove them by any other mode of conveyance. They feed also on cuttles and squid; I have taken them myself with these, and hundreds are constantly taken on the long-lines with this bait, shot in deep water, by the Plymouth and Brixham fishermen. The whelk is also a favourite food, and on the coast of Lincolnshire, at Sutton-on-Sea, and elsewhere, short stakes are stuck into the clayey foreshore, and a single hook fastened to each baited with a whelk. Skate are constantly taken. So stiff is the clay foreshore that the stakes remain a considerable time before they become uprooted by bad weather.—J. C. WILCOCKS (Plymouth).

MOLLUSCA.

Varietal Nomenclature. — Under this heading, in the December number of 'The Zoologist' (pp. 485-6), there appear some criticisms, purporting to be in answer to certain remarks of mine concerning the inexpediency of naming varieties of Mollusca. It seems to me that a more apt illustration of the truth of my remarks could hardly have been penned, if intended. Almost at the outset an illustration is furnished to my objection that the creation of these varietal names is mischievous in encouraging "too close an insistence on trivial and valueless minutiae, to the overlooking of the broader generalisations that underlie them." The concluding sentences of my article entirely preclude the idea that by "rufous type" I meant anything approaching a so-called "var. *rufa*." "Type" was, of course, used as a convenient word implying "group" or "class," though not exactly synonymous with either. Unfortunately no room seems to be left for generalisations in the doctrines of the variety-making school, nor do they apparently recognise the fact with which every naturalist should be familiar, that these variations are not fixed quantities, but merge into each other and combine to any extent; hence a string of names has to be employed, as admitted by my critic, or, in a word, each individual specimen has to be *described*, since each differs from its fellow. Varietal names are not given to human beings according to the colour of their eyes or the differences in their stature; nor, as a friend suggests, are cats divided into varieties according to the number, presence, or absence of rings on their tails. *These are matters of individual description, and should remain as such*, in snails as in other things. This, though he fails to perceive it, is the tendency of Mr. Cockerell's system of nomenclature, if such it can be called; "*major-depressa, tenuis-efasciata*, &c.," are descriptions, not names. For convenience, specialists might employ abbreviations of well-known terms (and, as a matter of course, by preference of Latin origin), placed in brackets after the specific name, to denote such departures from the type as might be worth chronicling. Thus *alb.* would stand for all *white* specimens of a usually coloured shell; *hyal.* for transparent ones; *ten.* for extra *thin* but not transparent, *preten.* for very

abnormally thin ones; *sol.* or *crass.* for extra thick examples, *persol.* for very abnormally thick ones; *depress.*, *conoid.*, and *acu.* for variations in form dependent upon the shape of the spire; *scalar.* for scalariform individuals; *sinist.* for reversed ones; *deform.* for obviously damaged or distorted specimens; *decoll.* for decollated examples; *cost.* for transversely ribbed; *stri.* for spirally striated; *unicol.* for specimens in which the coloration usually variegated is uniform and without markings; 1-*zon.*, 2-*zon.*, 3-*zon.* (or 1-*fasc.*, 2-*fasc.*, 3-*fasc.*), &c., to denote variations in banding (the usual band formula being retained for *Helix nemoralis* and *H. hortensis*); *ezon.* or *efas.* for bandless examples when bands are usually present. With respect to variations in the ground colour, greater care must be taken, as the terms used should be made to embrace as wide a generalisation as possible; but *ruf.* and *flav.* might be employed to denote changes in this respect quite apart from other variations such as those of markings or shape. These could be further supplemented, where necessary, by *oliv.* and *virid.*, &c. Other terms will, doubtless, suggest themselves, and be brought into use as required. Variations in size over and under the average should be indicated by actual measurements, not by the loose terms *major* and *minor*, which even Mr. Cockerell finds unsatisfactory. As many abbreviated terms of this description could, of course, be employed as required by the exigencies of the case. With regard to the question of trinomial nomenclature, which has been advocated by American ornithologists, it must be borne in mind that they propose to adopt it not for varieties that may occur anywhere, but for those which are confined to definite areas, to the exclusion of the type-form, and which have not unfrequently been described as distinct species. They do not, for instance, propose it for isolated cases of albinism, such as a white blackbird or rook. This is a vastly different thing from the course adopted by the namers of conchological varieties (so-called). If trinomial nomenclature be ever adopted in the case of Mollusca, it will be from the necessity of subdividing a large genus by inserting the subgeneric name, thus—*Helix Acaulus aspersa*. Moreover, by giving names to each trifling departure from a purely arbitrary type, not only are unnecessary complications introduced and the literature of Conchology overburdened, but the study itself is degraded to the level of mere collecting for collection's sake, and no further benefit accrues to the collector than the magpie derives from its hoard, or the schoolboy from his accumulation of postage-stamps. It is, however, one step better than the continental plan of creating *species* out of bad varieties. Not only is it a waste of energy that might be more usefully directed, but in the end defeats its own object, for ultimately the whole of this laborious work must infallibly be set on one side. To the real student of Nature, on the other hand, there are many lines of research open even in this small department of Natural History. The lingual teeth of many species are still unknown, as is also the anatomy of many more. The

food of most is but imperfectly recorded, whilst whether or no protective mimicry prevails amongst snails is but scantily guessed at. What influences the colouring, or want of colouring, in the shell, due allowance being made for the fact that when once a difference arises it is likely to be of frequent occurrence in that spot, owing to the very conservative nature of the Mollusca as regards heredity? What species will interbreed, and with what result? The very question of the inter-relationship between *Helix nemoralis*, *H. hortensis*, and *H. hybrida* is not yet satisfactorily determined, to say nothing of that existing between the various species of *Hyalina* (e.g., *H. cellaria*, *H. alliaria*, *H. Draparnaldi*, and *H. glabra*). These are some of the questions awaiting solution, if only patient investigators can be found; but they imply long and careful research amidst many disappointments, with no encouragement beyond the mere love of the subject, and the personal pleasure which is infallibly to be derived from the pursuit of such studies. Above all, it is necessary to avoid rushing into print with crude, half-developed ideas, or details of incomplete observations. Of course I cannot expect my variety-making friends to agree with me in all I have said, nor do I propose to carry the controversy any further. My sole intention has been to warn those who are really desirous to aid in the advancement of conchological science that the mere naming of varieties in no way tends to effect that object.—B.B. WOODWARD (British Museum, Nat. Hist.).

[We do not think anything will be gained by carrying this discussion further.—ED.]

Conchological Difficulties.—The notes on varietal nomenclature in 'The Zoologist' for December reopen the old questions, "What is a species, and what a variety?" Mr. Rowbotham seems inclined to deprecate the system of naming varieties, but he does not propose any system in place of it to embody the records which he admits are necessary. He states that differences in "size and colour" in shells are not important and ought to be excluded, and Dr. Jeffreys long since gave his opinion that "size, substance, sculpture, and lustre" are of little consequence. In considering therefore what is a variety, we should be almost entirely restricted to the form of the shell, together with any variation that might be noticed in the animal, and its habits, &c. I for one should be glad if Mr. Rowbotham could tell us what constitutes a true variety, if the above-mentioned characters are not to be taken into account. Whether the naming of varieties is an advantage or disadvantage, looked on scientifically, there is no doubt that it encourages industry, observation, and discrimination, and acts as an incentive to collectors to seek for new forms; whilst, on the other hand, the system of "lumping," in my opinion, checks research. I believe that observations, if accurate, cannot be too numerous. The numerous descriptions of present variations, if not of much use in the present generation, may be of the greatest utility to future investigators.

It would greatly facilitate study if leading conchologists would discuss the matter with the view of coming to some determination as to what should be considered a species, a subspecies, or a variety, and then to formulate standard rules for the guidance of collectors. If we could discover the *causes* of variation, we should be able to judge whether any particular form was likely to gain ascendancy in the struggle for existence, remain at a standstill, or drop out of the race. As to colour-variations, these may be much more important than they are assumed to be. The existence of many species may depend upon colour. There is a strong tendency amongst Mollusca, as well as amongst other creatures, to exhibit the colour of the soil or other surroundings in or on which they live. In Craven, where there are few hedges, I have noticed that very many individuals of *Helix rufescens* are of a greyish colour, assimilating to that of the walls on which they are found; whilst in the flatter and more wooded parts eastward they are dark brown or rufous, corresponding with the colour of rotten bark or decayed leaves. On the red clay or sand the red or reddish-brown shells of *Helix nemoralis* predominate over other colours. The similarity in *form* of the shell of *Clausilia laminata* to the elongated bud of the beech has been often noted. In my opinion our brightest coloured shells are becoming obliterated, or are gradually assuming the colours of the soil or rocks on which they are found. Mr. Woodward states (p. 412) that thin shells are the result of a deficiency of lime. I should rather think that thin shells are those which have only just arrived at maturity, and that they will thicken with age. I have found some very thin adult shells of both *Helix nemoralis* and *aspersa* on soil that was all lime, and very thick ones where there was next to none.—G. ROBERTS (Lofthouse, Wakefield).

PS. At p. 475, in the last number, the words "to be continued" have inadvertently appeared, the article being concluded.

SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

November 19, 1885.—Prof. MOSELEY, F.R.S., in the chair.

Mr. A. D. Michael exhibited and described the remarkable nymphal stage of *Tegeocranus cepheiformis*, a species of the group Oribatidæ, which he lately discovered for the first time in England. He has furthermore succeeded in tracing the whole life-history of this animal. The creature in its nymphal stage is exceedingly strange and beautiful. It carries on its back as concentric shields the dorsal portion of all its cast-skins, and these are bordered by projections each bearing a rose-leaf-like cuticular process of transparent membrane with chitinous nervures. The drawing of the nymph was first sent to Mr. Michael, two years ago, by Herr Pappe, of Bremen.

Mr. C. Stewart demonstrated, under the microscope, the stridulating apparatus of a species of *Sphærotherium*, differing in some respects from that described by Mr. Bourne (*infra*).

Dr. J. Murie exhibited and made remarks on the caudal end of the spine of a Haddock with an arched deformity, recalling what is recorded of the so-called Hump-backed Cod, *Morrhua macrocephala*.

Prof. P. M. Duncan read a paper on the "perignathic girdle" of the Echinoidea. The author maintained that as the structures which give attachment to the muscles that protrude and retract the jaws of the Echinoidea (which are parts of the test surrounding the peristome within) are not homologous in all the families of the group, it is not advisable to retain the old name of "auricles." He would substitute the term "perignathic girdle." The girdle consists of processes usually united above (though occasionally disconnected), and of "ridges" which connect the processes on the side remote from the ambulacra. The ridges are modifications of the inter-radial plates, the processes developments from the ambulacral plates. In the Cidaridæ the muscular attachments are all on disconnected ridges, and there are no processes. In the Temnopleuridæ, Echinidæ, Echinometridæ, and Diadematidæ, the retractor muscles are attached to "processes," which are growths of the poriferous portions of the ambulacral plates; and the protractor muscles and ligament of the radiales are attached to the ridge which is developed on the inter-radial plates, and is united by suture to the base of the "process." In the Clypeastridæ there are disconnected growths, which carry the jaws, and have slight muscular attachments. In *Clypeaster* there are ten processes, each arising from an ambulacral plate; and there are no inter-radial structures like ridges. In *Laganum* there are five growths, each arising from a first inter-radial plate; hence these are the homologues of ridges. The Clypeastridæ may thus be divided into two groups, on account of the presence of processes in one, and of the homologues of ridges in the other.

Prof. Moseley communicated a paper on the anatomy of *Sphærotherium* by Mr. Gilbert C. Bourne. The author remarked that while the general external features and specific distinctions of the genus had been amply discussed, the internal structure had hitherto received scant attention. Among other anatomical peculiarities he described a well-defined stridulating organ in the male. This consists of a prominent bolster-shaped swelling on the postero-external edge of the second joint of the second pair of copulatory appendages. The swelling occupies the entire margin of the joint, and shows a number of chitinous cross ridges and furrows. On the opposite interior surface of the last tergite are chitinous points. The former rasp-like organ of the second accessory appendages, when rubbed rapidly against the latter, produces a shrill note resembling that emitted by the House Cricket. A true auditory organ exists in the antennary fossa beneath the

eye. The tracheal system is unlike the majority of that of the Diplopoda, rather resembling that of Chilopoda and Insecta, though differing in the branched spiral filament not taking origin directly from the stigmata themselves. It appears that the tracheæ of *Sphærotherium* are a transition from those of the *Julus* type to those of the *Scolopendra* type. It would thus seem that the character of the tracheæ, the curved alimentary tract, the numerous chitinous pieces composing each segment, and the presence of a special hearing organ on the head, mark off the family *Glomeridæ* (to which *Sphærotherium* belongs) very sharply from the other families of the Diplopoda.

Prof. Moseley then read the following extract from a letter by Mr. G. C. Bourne, who is now investigating the Natural History of the Chagos Archipelago, in the Indian Ocean:—"Diego, Garcia, Sept. 18th, 1885. Arrived here on the 15th. The climate at present is very wet, but the rainy season is nearly over. The lagoon is fifteen miles long by about five miles across, with three islands. The main one is covered with cocoa-nut trees and other vegetation. Judging by the fragments thrown up on shore, there is a great variety of Corals, *Tubipora* being abundant, though *Madrepora*, *Porites*, and *Meandrina* are the commoner sorts; but *Fungia* and *Lobactis* are also plentiful. As yet I have seen but one lepidopteron and a few beetles. Birds consist chiefly of Noddies and Terns. Of Crabs, *Ocypoda*, *Gecarcinus*, and various Hermit Crabs are in swarms. *Birgus latro* does not occur on our islet. *Periophthalmus* is in great quantity on the outer shores. I have found a peculiar Bryozoon growing on one of the buoys in the lagoon; also a remarkable-looking Sea Planarian of a rich purple-black colour, with a narrow band of bright yellow running round the margin of its body. Large black Holothurians are abundant."

Prof. Moseley afterwards read extracts from another letter of an Oxford graduate, Mr. Sydney S. Hickson:—"Talissee Island, N. Celebes, Sept. 5th, 1885. I have been able to make several dredging expeditions in shallow water, *i. e.*, to 20 fms. The straits are very rich in Antedons, one species of a bright emerald-green colour is abundant on the coral reefs between this island and Kinabohoutar. Not 100 yards from the house where I am now writing there is *Tubipora* (alive), *Heliopora* (alive), and of course numerous other species of Corals. At Limbè I found small pieces of *Stylaster* alive, but I hope to find it here also. Nautilus shells are common on the shore here, and I have noticed a few with the animal decomposing in them. I am told that they are sometimes seen alive on the surface of the water, but on the approach of a canoe they at once dive into the sea, and are then difficult to catch. I shall try lobster-pots and other dodges. . . . *Lingula* I have not yet found, but am told by the Controller of the Senggir Islands that they are found in plenty there. . . . Maleos

are in abundance, and I caught any number of them and their eggs. At Koeang, when I was making the ascent of a volcano, I saw hundreds, many of them within a stone's-throw of me. I have found a cave filled with edible birds'-nests, but it belongs to a chief who is very jealous of it. I have been on one unsuccessful Babirussa hunt, but intend to organise another on Limbè Island. The Sapiutan, *Anoa depressicornis*, is common in some places. The Black Monkey, *Cynopithecus nigrescens*, is very common, being found in all the mangrove swamps. Earth-worms and Leeches I have not yet seen, but perhaps they will turn up in November or December when it rains. *Periopthalmus* is very common here, and I shall be able to make a study of it. There are plenty of Butterflies, but very few Beetles. . . . My thanks are due to Capt. McLean and the officers of the 'Flying Fish' for much help. My present plan is to stay here for some months, and do some quiet work; later on to go to the mainland to investigate the fauna of the great inland lakes, which is very interesting."

December 3, 1885.—Sir JOHN LUBBOCK, Bart., Pres., in the chair.

Sir H. E. Maxwell, Bart., Lieut.-Col. L. Blathwayte, and Messrs. R. A. Baston, S. J. Capper, C. Ford, G. B. Howes, J. H. Gurney, jun., W. H. Jones, W. F. A. Lambert, C. T. Musson, W. D. G. Osborne, D. Petrie, and G. Thom were elected Fellows.

Mr. Vincent J. Chamberlain exhibited and made remarks on a specimen of Trap-door Spider and its nest from California.

Prof. T. Spencer Cobbold read a paper, "On Parasites collected by the late Charles Darwin," including a letter from Mr. Darwin when transmitting the specimens to the author in 1869, and followed by Dr. Cobbold's own memoranda concerning eight of these, whereof one only, *Distoma Incerta*, proves to be new to Science.

A paper was read by Mr. P. Herbert Carpenter, "On the variations in the form of the cirrhi in certain Comatulæ." The shape and number of the cirrhus-joints of *Antedon phalangium* vary so greatly, both in the same individual and in specimens from different localities, that if the two extreme forms were met with in an isolated condition, they would assuredly be referred to different species of *Antedon*. The cirrhi of this species are classed by the author under four types:—(A) long-jointed; (B) intermediate; (C) square-jointed; (D) shortjointed. A is the typical form which occurs in the Mediterranean variety, but is also found in the Atlantic specimens, together with B, and also but more rarely C; while D is confined to individuals from the Minch and the Ross-shire coast, occurring together with C, which is rare in examples from the Atlantic, except in those dredged by the "Dacia" on the Seine Bank.

A technical paper by Mr. Joseph S. Baly (Part I.), "On the Colombian species of the genus *Diabrotica*, with descriptions of those hitherto

uncharacterised," was summarised by the Secretary. The author states that he has divided the genus into two principal sections, dependent on the relative lengths of the 2nd and 3rd joints of the antennæ.

Decembér 17, 1885. — FRANK CRISP, LL.B., Treasurer and Vice-Pres., in the chair.

Mr. Chas. Stewart exhibited the stridulating organs of a spiny Lobster, *Palinurus*; he showed under the microscope the file-like bow and its two tubercles, also by means of a softened specimen attached to the carapace he produced the peculiar grating noise which the animal makes during life.

A fine example of the Common Polecat, *Mustela putorius*, shot near Caermarthen, Wales, was shown for Mr. Edward A. Heath.

Mr. J. Jenner Weir drew attention to, and made comments on, the recently issued illustrated folios of 'Exotische Schmetterlinge,' by Drs. Staudinger and Langhams.

Mr. Frank R. Cheshire gave an epitome of his recent researches on the proboscis of the Bee, and explained the mode in which he believed the suction of nectar takes place.

Afterwards the following papers were read and discussed:—(1) Entomostraca collected by Mr. Haly in Ceylon, by Prof. George Stewardson Brady. The fresh-water forms were obtained at Colombo; the marine species were dredged at a depth of two fathoms, in the Gulf of Manaar. The fresh-water Copepoda and Cladocera approach well known European species. Among the Ostracoda is a curious new generic form, *Cyprinotes*; additional information is also given respecting *Cypris cylindrica* (*Malcolmsoni*) and *C. subglobosa*, &c. (2) A Monographic Revision of the Recent Ephemeridæ, Part IV., by the Rev. A. Eaton. (3) Colombian species of the genus *Diabrotica*, Part II., by Mr. Joseph S. Baly.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

December 1, 1885.—Prof. W. H. FLOWER, LL.D., V.-P.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's menagerie during the month of November, and called attention to a pair of Pale Fennec Foxes, *Canis pallidus*, from the Soudan, presented by Capt. J. S. Talbot; and to twelve examples of the Spectacled Salamander of Italy, *Salamandrina perspicillata*, presented by Prof. H. H. Giglioli.

Mr. F. Day exhibited and made remarks on a very curious fish, supposed to be a hybrid between the Dab, *Pleuronectes limanda*, and the Flounder, *P. flesus*.

Mr. Sclater laid on the table specimens of some rare birds sent for exhibition by Mr. Whitely, of Woolwich, and called special attention to a Hornbill, which seemed to prove that *Buceros casuarinus*, described by Mr.

G. R. Gray in 1871 from the head only, was merely the young stage of *Bycanistes cylindricus*.

Mr. E. Lort Phillips exhibited a fine series of heads of Antelopes obtained during his recent expedition to Somali-land in company with Messrs. James, and read notes on their habits and localities.

Mr. W. T. Blanford exhibited, on behalf of Capt. C. S. Cumberland, the head of a Wild Sheep from Ladak, supposed to be a hybrid between *Oris hodgsoni* and *O. vignei*.

Mr. John Bland Sutton read a paper, "On the origin of the Urinary Bladder," in which he endeavoured to show that the atrophy of the gills in all forms of the Vertebrates above the Amphibians might possibly be explained by the assumption of embryonic respiration by the allantois.

A communication was read from Lieut.-Col. Swinhoe, containing the fourth part of his memoir on the Lepidoptera of Bombay and the Deccan. The present paper concluded his description of the Heterocera; and also contained descriptions of the Tortricidæ and Tineina, which had been worked out by Lord Walsingham.

A communication was read from Dr. R. W. Shufeldt, containing a memoir on the comparative osteology of the Trochilidæ, Caprimulgidæ, and Cypselidæ. Dr. Shufeldt came to the conclusion that the Trochilidæ should form an order by themselves, and were not nearly related to the Cypselidæ, which were only much modified Passeres.

Mr. F. E. Beddard read the second of a series of notes on the Isopoda collected during the voyage of H.M.S. 'Challenger.' The present paper treats of specimens referable to the family Munnopsidæ.

A communication was read from Mr. Martin Jacoby, containing descriptions of some new species and a new genus of Phytophagous Coleoptera.—
P. L. SCLATER, *Secretary*.

NOTICES OF NEW BOOKS.

British Zoophytes; an Introduction to the Hydroida, Actinozoa, and Polyzoa found in Great Britain, Ireland, and the Channel Islands. By ARTHUR S. PENNINGTON, F.L.S., F.R.M.S. 8vo, pp. i.—xvi., 1—363, pls. xxiv. London: Reeve & Co. 1885.

MR. PENNINGTON has set himself the task of furnishing "a handy and at the same time reliable manual of the British Zoophytes," rightly apprehending that such a work would be widely welcomed by the numerous naturalists who visit the sea-side from varied motives.

A concise manual which obviates the necessity of taking down numerous books to the sea-side will always be valuable and popular, especially since the cost of anything approaching to a complete set of monographs is prohibitory to the great majority of field-naturalists. As Mr. Pennington's work is designed for this purpose, and is not intended to be merely a 'popular' book, it merits a careful scrutiny, as we have now arrived at a time when it is eminently desirable and comparatively easy to be perfectly accurate in structural details and in zoological nomenclature.

No practical naturalist will object to the title of the book or to the inclusion of the Polyzoa, but the omissions will lay the author open to some degree of criticism, since he states in the Preface he has "endeavoured to make the work a complete guide to all known British species."

The work commences with an interesting historical sketch, and general remarks on classification and distribution. The definitions of the groups of Hydrozoa and Actinozoa are unsatisfactory from the modern standpoint, and there are details of classification, as in the latter group, to which exception might be taken. Few zoologists now admit the Polyzoa into the sub-kingdom Mollusca; their nearest allies are certainly the Gephyrea, and Mr. Pennington should have referred his readers to Prof. Lankester's article, "Polyzoa," in the 'Encyclopædia Britannica.'

Before dealing with the systematic portion, Mr. Pennington gives a useful and on the whole an accurate summary of the anatomy of each group. The obsolete diagram of the Hydra (pl. i., fig. 1) should have given place to one which would really illustrate the text. The ectoderm and endoderm should be represented as distinct layers, and the generative glands are hopelessly erroneous. Prof. Lankester's article on the Hydrozoa (Encycl. Brit.) does not appear to have been sufficiently carefully studied. The discovery of nerve-cells in Hydroids by Weissmann and Von Lendenfeld is not mentioned.

The use of the term "stomach" in dealing with the anatomy of the Alcyonaria is somewhat obscure, as it might lead the reader to expect a tube or sac comparable with the stomach of other animals. The œsophagus is correctly stated in the account of the Actiniae to be lined with ectoderm, but the reader is left to assume this for the Alcyonaria. The œsophagus is stated to lead

into the stomach; the latter communicates directly with the body-cavity. Perhaps a better way of stating the facts would be to say that the œsophagus opens into the general cavity of the body, which is imperfectly divided into chambers by the mesenteries. The upper free edges of the mesenteries close round the included food, and digest it partly in the ordinary metazoon method, and partly by intracellular digestion, as in other Coelenterata. It is only when the food is surrounded by the edges of the mesenteries that the animal can be said to have a "stomach," for the remaining endoderm has not been proved to be digestive in function, and when digestion is not taking place the mesenteries are freely suspended in the general cavity of the body.

Mr. Pennington has unfortunately ignored the British Association Rules for Zoological Nomenclature, as the following will show. Throughout the Malacodermata he has followed Prof. Andres in making his families end in *inæ* and his subfamilies end in *idæ*, but, as he has followed Dr. Hincks, he happens to be correct in the Hydrozoa and Polyzoa. Priority in synonymy has not been adhered to throughout; the following will serve as examples:—*Peachia* (Gosse) takes precedence of *Siphonactinia* (Dan. & Kor.), and *Flabellum arcticum*, Sars., should be *F. laciniatum*, M. Ed. & H.

No mention is made of the following:—Hydrozoa—*Allopora oculina*, Ehr., *Staurocoryne wortleyi*, Rotch, *Campanularia calceolifera*, Hincks, *Lafoëina tenuis*, Sars. Actinozoa—"Halcompa" *microps*, Gosse (one of the *Edwardsiæ*, probably an immature form), *Halcompa fultoni*, St. Wright (a parasitic anemone, also immature), *Actinia cylindrica*, Reid (= *Peachia hastata*, G.), *Actinia (Heliactis) alba*, Cocks, *Sagartia (Thoe) pellucida*, Cocks, *T. alderi*, Cocks, *T. yarrellii*, Cocks, *T. bellii*, Cocks, *T. hastata*, E. P. Wright, *Bunodes monile*, Templ., *Acthelmis intestinalis*, Fabr., *Polythoa rubicornis*, Holdsw., *P. anguicoma*, Norm., *Cerianthus vermicularis*, Forbes, *Ceratocyathus ornatus*, Seguenza, *Desmophyllum stokesii*, M. Edw., *D. crista galli*, M. E. & J. H., *Amphihelia profunda*, Pourt., *A. oculata*, Linn., *A. miocenica*, Seg., *A. atlantica*, Dunc., *A. ornata*, Dunc., *A. ramea*, *Balanophyllia socialis*, Pourt., *Pliobothrus symmetricus*, Pourt. It is true that some of these corals are deep-water forms, but they are entitled to rank as British. The subfamily *Cornularinæ* has been omitted, viz.,

Sarcodictyon (*Rhizoxenia* *vide* Norman), *catenata* Forbes (= *S. agglomeratum*, F.), and *S. albicolor*, Norm. (possibly a variety of the former); also *Kophobelemnion mülleri*, Sars., and *Bathyptilum carpenteri*, Köll.; and several others.

Although the *Lucernariæ* are, strictly speaking, *Medusæ*, their habit is "zoophytic," and they might very well have been inserted, especially as the Rev. Dr. Landsborough described them in the prototype of this book. The only Medusa mentioned is the exotic fresh-water Medusa (*Limnocodium sowerbii*, Allm.), and this is inserted at the end of the Polyzoa.

The localities of several of the rarer species have not been recorded which have been added by Prof. Herdman from Lamlash Bay, by Drs. Leslie and Herdman from the Firth of Forth, and by other naturalists from various parts of the British coast. The following new species are imperfectly described and figured:—*Tubularia Britannica*, *Sertularia argentella*, and *Aglaophenia plumosa*.

In order that such a work as this should enable a beginner to identify any form he comes across, either of the two following conditions is absolutely necessary—(1) an accurate figure of a characteristic species of at least every genus, or (2) tables or analyses by which any genus or species may be ascertained. Neither of these is found in this book, and it is difficult to understand how anyone not previously acquainted with many of the species could hope to name his captures, especially since *all* the species are not described, even when mentioned; for example, *Edwardsia allmani*, M'Int., and *E. goodsiri*, M'Int., are merely referred to; unfortunately also they are placed under the genus *Edwardsiella*, although they possess less than twenty tentacles. (These forms will probably prove to be varieties of *E. beauteempsii*, Quatr.). The bibliography has throughout the book been compiled in a perfunctory manner.

Nevertheless to the naturalist who already has some acquaintance with the forms described, and who requires a handy book of reference in the laboratory or at the sea-side, this work will prove very useful.



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ON THE GENUS *HÆMATOPUS* OR OYSTERCATCHERS.

BY HENRY SEEBOHM.

BRITISH ornithologists are too apt to limit their interest in birds to those of their native country, and thus to miss many of the great lessons which a broader view of the subject teaches. The study of any local fauna is a subject of great interest, but the interest is multiplied tenfold when the details collected in the course of such study are compared with those observed in other countries. The study of a part can never be so instructive as the study of a whole, and though life is not long enough for any one man to master the whole of such a complicated subject as the ornithology of the entire world, every ornithologist should monograph at least a few genera, to obtain some little insight into the wide field of knowledge which such a task opens to the view.

The Oystercatchers are a small compact group of birds, very closely connected with each other, and very clearly differentiated from all other groups of birds. They present another peculiarity, which makes them additionally interesting—they are almost cosmopolitan in their range. They are strictly shore birds, but they do not confine themselves to the sea-shore. They frequent the margins of lakes, the banks of great rivers, and are occasionally seen in other localities inland during migration. Some species are migratory, others resident, whilst some are migratory in one part of their range, and sedentary in another part. They are

semi-arctic birds, the limit of their northern range corresponding to a considerable extent with the isothermal lines. In North-west Europe, where the influence of the Gulf Stream raises the latitude of suitable climate, Oystercatchers breed as far north as lat. 70° , in East Russia and West Siberia up to 66° , but in East Siberia and on the American Continent only up to about 60° . In the Southern Hemisphere the southern limit of their breeding range is determined by the limitation of the land. No Oystercatcher is known to breed within the Tropics on the mainland, but there is reason to believe that they breed on some of the islands within the Tropics, the Bahamas, the Galapagos Islands, the islands on the north coast of Australia, and possibly elsewhere; otherwise Oystercatchers are only winter visitors to the tropics.

The Oystercatchers constitute the genus *Hæmatopus*, which belongs to the family *Charadriidæ*, a group of birds which also includes the Sandpipers, Snipes, Plovers, Turnstones, &c. Some ornithologists split this family into two, *Charadriidæ* and *Scolopacidæ*, but the Oystercatchers are witnesses against the evidence of such a course. It is impossible to decide in which of the two pseudo-families they should be placed. The American ornithologists (whose practice of splitting amounts almost to a monomania) cut the Gordian knot by placing the Oystercatchers in a family by themselves, which they call *Hæmatopodidæ*!

In the family of *Charadriidæ* the scutellations of the tarsus vary to a remarkable degree. In some species the tarsus is covered both in front and at the back with broad scutellations, the front row being connected with the back row by fine reticulations which cover the side of the tarsus. In other species the front row of scutellated plates alone is present, the back of the tarsus as well as the sides being covered with fine reticulations; whilst in a third group the fine reticulations extend all round the tarsus. These three groups are obviously purely artificial ones, and are open to another serious objection. They are not separated from each other by a hard-and-fast line, but many genera include forms which are intermediate between one and the other. Nothing of this kind, however, occurs in the Oystercatchers; they all clearly and undoubtedly belong to the third category, in which the whole of the tarsus is covered by a fine network of small

hexagonal reticulations. To this group belong also the Red-billed Curlew (*Ibidorhynchus*), the Stone Curlews (*Ædicnemus*), the Stilts and Avocets (*Himantopus*), and some of the Plovers (*Charadrius*). To distinguish the genus *Hæmatopus* from these genera it is necessary to take into consideration two other characters. Compared with the Stilts, Stone Curlews, and Plovers, the Oystercatchers have long bills and short legs, so that the character of bill longer than tarsus effectually excludes these birds. It does not, however, exclude some of the Avocets, with their slender recurved bills, or the Red-billed Curlew, with a bill decurved like that of an Ibis. The clumsy, nearly straight bill of the Oystercatchers distinguishes them from these birds. In spite, however, of the extraordinary fact that it possesses a bill of such a totally different shape from that of an Oystercatcher, there can be no doubt that the Red-billed Curlew is the nearest surviving relative of the Oystercatchers. It is, in fact, nothing but an Oystercatcher with a modified bill. The bill of the Oystercatchers is very abnormal. Most birds have beautiful bills remarkable for the subtlety of their curves, but the bill of the Oystercatchers can only be regarded by an artist as "sadly out of drawing." The diagnosis of the genus *Hæmatopus* will therefore stand as follows:—

Charadriidæ, with a nearly straight bill, longer than the tarsus, which is reticulated all round. Each of these three characters may be found in other birds of this family, but no birds belonging to it combine all three characters, except the Oystercatchers.

There is abundant evidence in support of the hypothesis that the centre of dispersion of the *Charadriidæ* was the North Pole; that the Oystercatchers were originally residents on the shores of the Polar Sea, whence they were dispersed and driven southwards by the arctic ice which formed and reformed during the Glacial Epoch. Isolated on various distant shores, the consequences of isolation soon appeared and differentiated the Oystercatchers into several specific and subspecific forms. It is very interesting to trace their wanderings and to note their specific differences, which agree in a remarkable manner with the hypothesis of their polar origin and with their present geographical distribution, although the latter bears no sort of relation with the geographical regions laid down by Messrs. Selater and Wallace, which refer to pas-

serine birds, but are seldom recognised by those belonging to other families.

The descent of an arctic climate upon the North Polar regions soon drove the residents of the Polar basin into more southern latitudes. Coast-birds like the Oystercatchers could escape by four routes. They could either follow the European or the American shores of the Atlantic, or the Asiatic or American shores of the Pacific. If they availed themselves of all four routes, the emigrants would soon become isolated in four colonies, which would eventually produce four species or groups of species. Behring's Straits lies 25° south of the Pole, and the Asiatic coast is connected by a row of islands with the Pacific coast as far as 40° from the Pole, so that isolation and consequently differentiation would begin late with the Pacific birds; whilst in the Atlantic the emigrants would probably be effectually isolated for ever by Greenland's icy mountains at a distance of not more than 5° or 7° from the Pole. It would therefore be reasonable to expect that the Pacific Oystercatchers would be much nearer allied to each other than the Atlantic Oystercatchers are.

Let us now examine the peculiarities and geographical distribution of each species, and see how far our theories are supported by facts.

1. *Hæmatopus palliatus*. — The North American Pied Oystercatcher, like *all* the other Oystercatchers, has the entire head and neck nearly black, and the bill red. It resembles *all* the *Pied* Oystercatchers in having the greater wing-coverts, the upper tail-coverts, a considerable part of the secondaries, and the under parts below the neck, white. Further, it agrees with *all* the Oystercatchers of the *New World* in having pale flesh-coloured legs. Its specific character consists in having the rest of the plumage (*i. e.*, the upper parts below the neck, with the exception of the greater wing-coverts and the upper tail-coverts) brown.

Leaving Greenland to the left, the ancestors of the North American Pied Oystercatchers probably retreated from the Polar ice down Baffin's Bay, and gradually extending their range southwards along the Atlantic coast of North and South America, rounded Cape Horn, and turning northwards again along the Pacific coast of South America their descendants have extended their range northwards as far as Lower California, which appears

to be the present limit of the emigration of this party. Their route precisely corresponds (so far as is known) with the present range of this species, except that it is not now found north of Labrador.

2. *Hæmatopus leucopus*. — The Falkland Island Pied Oystercatcher principally differs from its more wide-spread ally in having the brown parts replaced by black. Its range extends from the Falkland Islands and the islands in the Straits of Magellan to those on the south-west coast of Patagonia. This species is unquestionably an offshoot of the preceding species, which has become differentiated in consequence of its having become isolated on the Falkland Islands, whence it probably spread later to the islands off the Patagonian coast.

These two species represent the Atlantic New World group of Oystercatchers, which may be characterised as having flesh-coloured legs, white lower under parts, and dark rump.

3. *Hæmatopus niger*.* — The North American Black Oystercatcher, like all the Oystercatchers of the New World, has pale flesh-coloured legs, but, like all the Oystercatchers which passed through the Behring Sea, the whole of its plumage has become black. This species is a summer visitor to the Aleutian Islands and the southern shores of Alaska, breeding as far south as the coast of Upper California, where it is probably a resident, and wintering on the coast of Lower California.

4. *Hæmatopus niger ater*. — The South American Black Oystercatcher only differs from its more northern ally in having generally a shorter and deeper bill. Examples in my collection of the northern form have bills $3\frac{1}{4}$ inches in length and 0.5 in. in depth, whilst others from Chili have bills $2\frac{3}{4}$ in. in length and 0.6 in. in depth. It is said, however, that in a series of each the dimensions are found to overlap, so that the American ornithologists very justly regard the two forms as only subspecifically distinct. This form is evidently the result of an emigration from the range of the preceding species, which has caused a colony to cross the Tropics and establish themselves as residents on the coasts of Chili, Patagonia, and the Falkland Islands; but the

* Pallas described this species as inhabiting the Kurile Islands. It certainly does not do so now. The great Russian traveller may have been deceived, or it is possible that a stray bird had been driven across the Pacific from Alaska by a storm.

isolation of the two colonies thus produced does not appear to have lasted quite long enough for the complete differentiation of the two forms.

These two forms represent the Pacific New World group of Oystercatchers, which may be characterised as having the whole of the plumage black, and the legs flesh-coloured.

5. *Hæmatopus unicolor*.—We have attempted to trace the history of the American detachment of Oystercatchers, and we must now try and follow the fortunes of the other portion which retreated along the shores of the Old World. The two American parties found a comparatively restricted coast-line at their disposal, and both of them seem to have been glad enough to retrace their steps, after the glacial climate had passed away, almost to the entrance of the Polar Sea. The Asiatic party, on the other hand, found a practically unlimited extent of coast-line suitable to their requirements. They seem to have had room and to spare in Australia, South Africa, and on some of the numerous islands in the southern half of the Eastern Hemisphere; consequently they have never had occasion to recross the line to occupy once more their old route of emigration on the Pacific coast of Asia. But although they have wandered to the other side of the world, the fact that the two Pacific parties travelled in company for more than two thousand miles further than the two Atlantic parties could have done has produced precisely the results which we anticipated. The Pacific Old World Oystercatchers scarcely differ from the Pacific New World Oystercatchers in anything beyond the colour of their legs. The Australian Black Oystercatcher resembles its American cousin in having the whole of its plumage black; but the basal half of the bill is slightly more elongated, and the colour of the legs and feet are brick-red, instead of pale flesh-colour. It is a resident throughout the coasts of New Zealand, Australia, and Tasmania.

6. *Hæmatopus unicolor capensis*.—Instead of retracing their steps to the Behring Sea, the surplus population of the Australian Black Oystercatchers appear to have emigrated westwards to South Africa. The African Black Oystercatcher is so closely allied to its Australian representative that many ornithologists do not discriminate between them. It may, however, be recognised by its shorter bill, the basal half of which is not exceptionally elongated, and by the colour of its legs and feet, which are not

brick-red, but deep crimson. It can scarcely be regarded as more than subspecifically distinct from the Australian form. It is distributed along the entire coast of South Africa, ranging as far north as the Canary Islands in the west, and into the Red Sea in the east. It probably breeds south of the line, only wandering northwards in the autumn (about March).

These two forms represent the Pacific Old World group of Oystercatchers, which may be characterised as having the whole of the plumage black, and the legs red.

7. *Hæmatopus ostralegus*.—As has already been suggested, we find that the East and West Atlantic Oystercatchers differ more from each other than the East and West Pacific ones do. The European Oystercatcher differs from the North American Pied Oystercatcher in many important particulars besides the colour of its legs. Like all the Old World Oystercatchers, it has red legs—perhaps dull crimson expresses the exact shade of red. The under parts are precisely like those of its ally, but its lower back, rump, and upper tail-coverts are white, whereas in the latter the upper tail-coverts only are white.

In treating of the Pacific Oystercatchers we found that the difference in the conformation of the land in the Old World from that in the New World caused the emigration of the two parties to proceed on different lines. Precisely the same difference is to be found in the distribution of the two Atlantic parties, owing to the same cause. The distribution of the European Oystercatcher, to quote from my 'History of British Birds,' is as follows:—

“The West Palæarctic species ranges from the Atlantic to the valley of the Obb. In the western portion of its distribution it is almost exclusively a sea-shore bird, but east of the Black and White Seas it is only found during the breeding-season on the shores of lakes and rivers. It is a regular summer visitor to the coasts of North-west Europe as far north as land extends, and as far east as Archangel; but further east it is no longer found on the sea-shore, and ascends the Volga and the Kama, crossing over to the Petchora, on the banks of which river, as also on those of the Obb, it only ranges as far north as the Arctic circle. It is a summer visitor to the shores of the Baltic, but on the coasts of North Germany, Great Britain, and France it is a resident. In the basin of the Mediterranean it is principally known as passing

through on spring and autumn migration; but a few remain to breed in the delta of the Rhone and on the Adriatic coast, where also a few remain during winter. It winters on both coasts of Africa, on the west as far south as Senegambia, and on the east as far south as Mozambique. It is a resident in the Caucasus, but to the valleys of the Don and the Volga, and to the lakes and rivers of Western Siberia and Turkestan, it is a summer visitor, wintering on the Mekran coast and the west coasts of India as far south as Ceylon."

The West Coast of Africa south of Morocco appears to have been of such a desert character that the Oystercatchers were afraid to emigrate further in that direction. The basin of the Mediterranean, on the other hand, provided the necessary outlet for the surplus population, and the stream of emigration continued to flow eastwards from sea to sea, lake to lake, and river to river, at least as far as the Obb. The advanced party appear to have pushed forward still more to the east, and to have reached the valley of the Amoor, whence they never returned, but, following the course of that river to its mouth, they established an independent colony. The cessation of interbreeding between the birds of this colony and the parent stock soon caused a variation between them, and the eastern birds are now generally regarded as specifically distinct, but the difference, though constant, is very slight.

8. *Hæmatopus osculans*. — The Japanese Oystercatcher only differs from the British species, with which we are familiar, in having on an average a longer bill, in having the upper tail-coverts more constantly tipped with black, and in having much less white on the wings. The white on the outside web of the primaries does not appear until the sixth quill, and on the inside web not until the second quill; whereas in the European bird the white on the outside web appears on the third quill, and that on the inside web on the first. The range of the Japanese Oystercatcher extends for perhaps a hundred miles up the Amoor, and northwards to the shores of the sea of Okotsk, between East Siberia and Kamschatka. Southwards it reaches the shores of North China, and in winter those of South China. They still appear to retain some tradition of their western origin, and occasionally a bird will attempt to find its way back again across country, and appear as an unwonted visitor in Burma or Arrakan.

8. *Hæmatopus longirostris*. — Probably the same catastrophe which drove the Japanese Oystercatcher to the east, an unusually late cold spring, induced a second party to start from the winter quarters in Ceylon, in order to emigrate in a different direction in search of more advantageous breeding grounds, which they appear to have found in Australia. The Australian Pied Oystercatcher differs somewhat more from our birds than its Japanese ally. Both the eastern birds have light red legs, but the Australian species has lost all trace of white on its primaries, and the black of the mantle extends some distance on the lower back.

This species is a resident on the coasts of New Zealand, Tasmania, and Australia, but does not range further north than the southern shores of New Guinea and to other islands immediately to the north of Australia.

These three species represent the group of Oystercatchers which emigrated along the Atlantic coast of the Old World, and may be characterised as having red legs and white rump, as well as white lower under parts.

This completes the list of Oystercatchers, a group of birds whose peculiarities of colour and whose geographical distribution bear unmistakable evidence of the Glacial Epoch almost as obvious as the geological evidence. We can trace almost with certainty the routes which the various parties took on their emigration from the shores of the Polar basin. The great invasion of Europe by Pallas's Sand Grouse in 1863 is almost the only instance of sudden migration which the present generation of ornithologists have witnessed, but the gradual extension of the breeding areas of many species of birds has been remarked over and over again. As regards the Oystercatchers, it seems to me that we can almost trace their history from the origin of the genus in the small area of the Polar basin, until it has become almost cosmopolitan in its range.

VOYAGE OF THE 'ECLIPSE' TO THE GREENLAND SEAS,
CAPT. DAVID GRAY, COMMANDER.

[Mr. Robert Gray, who sails with his father, Capt. David Gray, in the capacity of first mate, has kindly allowed me to send you for publication the following extracts from his private log of the voyage made last year (1885), which I think will be found of interest to some of your readers. Capt. Gray, who has had many years' experience in the Greenland Seas, and is I believe the fourth generation of a family of successful Whalers, has made some valuable contributions to the natural history of the Right Whale, also of the Bottle-nose, *Hyperoodon rostratus*, and was mainly instrumental in obtaining the present close time for Seals, a further extension of which he is now endeavouring to procure.—THOMAS SOUTHWELL.]

THE 'Eclipse' left Peterhead on March 3rd, and Lerwick on March 12th. A great many birds were seen in Bressa Sound, Gulls, Kittiwakes, and a few Dovekies, or Black Guillemots.

March 13th. Noon, lat. $62^{\circ} 33' N.$, long. $1^{\circ} 0' W.$; wind N.N.W. A few "Mallemauks" (Fulmars) and a number of Gulls seen.

14th. Noon, $65^{\circ} 23' N.$, $0^{\circ} 2' W.$; wind W.N.W., force 7.* Numbers of Mallemauks (Fulmars), and a few Rotches (Little Auks) seen.

15th. Noon, $66^{\circ} 55' N.$, $0^{\circ} 30' W.$; wind W.N.W. Several "schools" of Bottle-nose Whales seen going N.E. Mallemauks and Kittiwakes numerous all day; Looms (Guillemots), Rotches, and one or two Dovekies. Crossed the Arctic Circle.

16th. $69^{\circ} 22' N.$, $0^{\circ} 32' E.$; wind W.N.W., force 8; temperature of air 34° . Aurora Borealis very brilliant. "Some six or seven Snow-birds (Ivory Gulls) were noticed in the afternoon, and as these birds are seldom seen far from ice their appearance was considered significant of its neighbourhood, but we afterwards found that they were nearly 130 miles from the nearest ice; their presence therefore could only be explained by the prevalence of strong westerly winds."

21st. $68^{\circ} 24'$, $1^{\circ} 49' W.$, force 8; air 15° , sea 35° . One Finner and two Bottle-nose Whales, also Rotches, Looms, Mallemauks, and Kittiwakes seen. Some birds and Bottle-noses seen daily on 22nd and 23rd.

* The strength of the wind is according to Beaufort's scale.

24th. 70° 30' N., 4° 15' W.; wind W., force 3; air 28°, sea 30°. The edge of the main ice in sight. "The first good day since leaving Lerwick." "A number of Bottle-noses seen to-day; some very large bulls, and *one female with sucker.*"

29th. 72° 50', 2° 45' E.; wind S.W. by S., force 5; air 55°, sea 31°. Passed one Seal on a piece of ice.

30th. 73° 48', 5° 28' E.; wind N.N.E., force 8; air 16°, sea 29°. "Early this morning a Raven came near the ship, and for a few minutes hovered over so close that we could easily distinguish the open spaces between the primaries of the wings."

On 30th four mock suns seen. The whole month of March was a constant succession of gales, more or less severe, and bad weather of all sorts with tremendous seas. The air temperature was 15° on the 22nd (sea 34°); the temperature of the sea varied from 28° to 35° as the ship stood on and off the ice; lowest barometer 28° 7' on the 26th.

April 1st to 3rd. Bad weather continued on the 1st; the barometer fell to 27° 82' before a S.W. gale. On 3rd steamed into the ice, "reaching smooth water and shelter for the first time since leaving Lerwick, a period of twenty-two days, during which time we have had to lie to for gales of wind eight different times."

3rd to 16th. The 'Eclipse' virtually missed the young sealing, owing to the weather she had encountered, and went N.W. to shoot old Seals.

17th to 20th. Between 77° 20' N., 2° 15' E., and 78° 5' N., 0° 0' long. Many Seals and Narwhals were seen, with Looms (Guillemots), Rotches (Little Auks), Dovekies (Black Guillemots), Snow-birds (Ivory Gulls), Burgomasters, and Mallemauks (Fulmars); prevailing winds S. and S.W.

May 2nd. 74° 30' N., 10° 0' W.; wind N., force 3; air 23°, sea 29°. "This forenoon a large bird was seen a short distance from the ship, much larger than the Burgomaster, our largest Gull, most probably one of the Albatross family."*

16th. 78° 10' N., 3° 10' E.; light southerly air; air 23°,

* On the 15th June, 1878, in lat. 80° 11' N., long. 4° E., Capt. Gray shot an Albatross, said by Mr. Sim, of Aberdeen ('Land and Water,' vol. xxvi. (1878), p. 331), to be a Black-browed Albatross (*Diomedea melanophrys*, Temm.), which is now preserved in the Peterhead Museum.—T. S.

sea 29°. The land of Spitzbergen seen at night, heading E. Many birds and a few Narwhals seen.

18th. 79° 6' N., 4° 27' E.; wind S.W.; light air 29°, sea 31°. Rotches and Looms very numerous, and water very greasy.

19th to 22nd. Vast numbers of Looms, Rotches, and Mallemauks, numbers of Dovekies, and a few Eider Ducks, Snow-birds, Burgomasters, and a Puffin.

27th. 79° 44' N., 3° 16' E.; calm. At 5 p.m. reached the edge of the Polar barrier, a vast expanse of frozen pack, over which no water was to be seen to the northward.

June 5th to 11th. A Snow-bird caught fed from the hand on the second day. On the 6th three Bears were seen; also a flock of Brent Geese, five of which were shot by the 'Hope.' Numbers of Looms and Narwhals.

17th. A Beluga or White Whale seen; very unusual in these waters.

20th. Many Hooded Seals were seen, and 250 shot on the stream-ice. "Unlike the other *Pinnipedia*, they do not hesitate to give battle, and await the approach of a boatful of men with apparent indifference. When attacked this Seal inflates his hood, which acts as a helmet, then rearing himself majestically he prepares to give battle when discretion would be the better part of valour. It seems remarkable that this animal should have preserved his valour in spite of from fifty to sixty years persecution."

23rd. 73° 8' N., 11° 49' W. "Floe-rats" (*P. hispida*) numerous, and foot-prints of Bears seen on the floe, the sea containing much Whales' food. The colour of the water most frequented by Whales is green, from pea- and olive-green to green shaded with blue and sometimes peacock-blue. Whales always prefer the parts of the ocean most rich with food where suitable ice is; these spots they seem to search for and there congregate. The presence of Whales is often indicated by their "blowings"—that is, mucus discharged from their blow-holes. Blowings recently discharged shed a film of grease around on the water, and a peculiar smell accompanies them. The blowings of "Finners" differ from those of the "Right Whale"; they present the appearance of long streaks of yellowish stringy matter, easily distinguished from the mucus discharged by the *Mystecetus*, which generally lies in detached spots, and has not

such a coarse appearance. "Greasy water" is caused either by the Whales themselves, by Narwhals, or by the presence of small Crustacea in the water. "In fine weather, when the sea is smooth, a person looking over the ship's side as she is either sailing slowly along, or lying still upon the water, will have his attention attracted by the frequent appearance of particles of oil rising to the surface, spreading out and displaying the usual prismatic colours. This phenomenon is caused by the presence of the various organisms which constitute 'whales' food,' and to it is due the vast sheets of oil which sometimes cover the sea for many miles, evidence of the extraordinary richness in animal life of some parts of the Greenland seas."—R. G.

24th to 30th. Weather calm and fine; winds variable; temperature of air from 29° to 36° , sea 32° to 34° . Many Bears seen, some killed. Narwhals also numerous, one killed by the 'Erik' had *both tusks* developed; large "Finners" (*B. Sibbaldii*) frequently seen. Hooded Seals frequent, and every piece of ice covered with "Floe-rats" (*P. hispida*). The 29th was "a most beautiful morning, not a breath of wind ruffled the mirror-like surface of the water. Numbers of Narwhals and 'Floe-rats' played about, and sometimes one of the great 'Finners' would come suddenly along, rise once or twice to the surface, and continuing his course soon be lost to view. A great many birds—Looms, Rotches, Dovekies, Snow-birds, Burgomasters, Kittiwakes, and Mallymauks—flying hither and thither, some alighting on the ice, others diving for food. Now and again a prowling Bear would be noticed coming along, either stalking about in an aimless manner or watching a Seal. On the 30th many 'Finners,' Narwhals, and a Greenland Shark were seen."

July. All the month spent cruising in search of Whales. Prevailing winds from the eastward; average temperature of the air 33° , sea 34° ; much fog. East coast of Greenland occasionally in sight. Birds numerous, also Hooded Seals, Floe-rats, Finners, and Narwhals; the latter were observed *accompanied by young ones*.

August 1st. Light N.E. wind and fog. When clear coast showing high and bold from Shannon Island southward. With the exception of a few Ground Seals, *Phoca barbata*, the sea containing remarkably little life. Very few birds seen either this day or on the 2nd in $73^{\circ} 38' \text{ N.}$, $17^{\circ} 46' \text{ W.}$, when

the land was visible from Shannon Island to Cape Hold-with-Hope.

3rd. $72^{\circ} 50' N.$, $16^{\circ} 15' W.$; calm light air from W. The character of the water changed, and life became at once abundant. Narwhals, Seals, and Bears seen, and a Walrus shot, which had been feeding on Seals. Bay-ice beginning to form, and pools of fresh water frozen over.

6th. $71^{\circ} 5' N.$, $18^{\circ} 34' W.$; calm and fine. Steamed S.W. towards the entrance of Scoresby's Fiord until stopped by ice; coast very grand, fine precipices and glaciers. Scoresby estimates the average height at 3000 feet. Rotches in clouds; "they are already coming off the land accompanied by their young." From this point the 'Eclipse' headed for home, reaching Peterhead on the 17th August.

THE PROBLEM OF THE SOARING BIRD.

BY J. LANCASTER.*

It is now more than two years since I first made known the results of investigations on the methods of flight of the great soaring birds, carried on at intervals since 1850. The Whooping Cranes of the north-west, performing their migrations on motionless wings, had at that early date fixed my attention, and my times of leisure down to 1876 were devoted to ransacking the scientific and literary world, and to observing the birds in the act whenever it was possible to do so, that I might get an explanation of the phenomenon of more substantial character than mere guesswork. Plenty of assumed solutions were found scattered about. Such theologians as I consulted were confident that the question had reached its lowest terms when it was said that "God had created the birds to fly." Common-sense folks rejected the idea of fixed wings, and held to a slow flapping that could not be seen, while the scientists were confident of upward slanting currents of air and various atmospheric disturbances which produced the result. Accounts of travellers as to the facts were hopelessly confused, with a single exception, that of Charles Darwin, in his 'Naturalist's Voyage around the World.' His

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solution of the matter, that of the surging head, was given provisionally.

I was not prepared to deny any of the solutions given, and not more ready to admit them, being conscious of very much ignorance of the entire matter. Meanwhile my interest in the subject, constantly increasing, had, in 1876, overshadowed all others, and being disengaged from business, I devoted the ensuing five years to the birds on the Gulf Coast of South Florida, where the soaring varieties were found in abundance, fully intending to unravel the case before leaving it. The task was a hard one, and the final solution was found in a totally unexpected direction. The predominant feeling I have since experienced in regard to it is one of surprise—surprise that in this ceaselessly active age mechanical possibilities of the most important character could exist in the atmospheric spaces all about us, with many of the largest species of existing birds putting them in daily practice before our eyes, and we still remaining completely ignorant of them! I propose in this paper to present, first, a few of the most significant facts exhibited by the soaring birds; next, to offer an explanation of the phenomenon; and finally, to examine the bearing of what has been said on the problem of artificial air-navigation.

I mean by a "soaring bird" one which habitually travels the air on motionless wings. All birds flap their pinions at times, and many of the smaller kinds, such as Rooks, Kestrels, Crows, and Gulls can maintain flight on fixed wings when the conditions are favourable. But I would never think of observing them for lessons in soaring. They are too light to average the inequalities in the air current, and there are frequently long intervals of active wings before the fixed conditions occur. The soaring varieties are at it all the time. The Frigate-birds live in the air night and day for a week at a time without touching a roost. Their congeners, the Buzzards, spend the day in the same style. The various Cranes common to the coast often spend hours resting in the air, while the Gannet is an admirable soaring bird with a heavy body and relatively small expanse of wings.

When I speak of "fixed" or "motionless" wings the meaning is that no muscular power is used to either overcome weight or air resistance. It is not meant that the pinions are absolutely rigid, like a board, for they are moved to accomplish change

both in shape and position. But they do precisely resemble a board so far as the exertion of motive power is concerned. For instance, if a bird floats in a wind of unvarying velocity over any fixed point on the earth, then if a board of the same shape and size and weight were put in its place it would remain there just as the bird does, as long as the conditions were unchanged. If the bird slightly changed the shape or position of its surfaces so as to vertically ascend indefinitely, the board would also ascend in the same way were it to be changed in a similar manner.

This is seen in the performances of what I have termed "effigies." They were surfaces of veneer or cardboard fastened to a frame and balanced by a weighted pendant. They would simulate the actions of "soaring" perfectly. I have made numbers of them. They would leave the hand and travel against the wind for as much as 500 yards, remaining up for fifteen minutes. They had no ability to automatically balance themselves in unsteady currents of air, but they were good illustrations of "soaring."

The first thing to be definitely ascertained was whether the wings of the soaring birds were in fact as motionless as they seemed. To determine this point demanded close inspection, and although the creatures were not fearful of man in that remote country, they preferred a distance of thirty or forty feet away. The captive bird was useless for any critical test. 'Tis true that a bird ten feet in alar dimensions, resting horizontally above one's head thirty feet away, with the clear sky as a background, could be pretty well examined; still a closer position was not only desirable but imperative, and a resort was had to the arts of mimicry with entire success. Procuring a few square yards of thin muslin fabric sufficient to completely envelope my person, it was covered with paint of the green and brown shades so as to resemble the tree tops of localities in the vicinity of either the breeding-places or the roosts of the soaring birds, and barring the unpleasant sensation one has when engaged in the arts of gross deception, I had everything pretty much my own way. Some trouble was experienced in striking the happy mean of scaring the great creatures enough to keep them from alighting on my face, and still not frighten them away, as they were totally oblivious of my presence. Wing movements could now be studied in every conceivable position at leisure, endwise, sidewise, from

above, from beneath, and at every sort of obliquity. The conclusions of observations made from the ground at thirty feet distance were confirmed from the tree-top stations at all distances, from twelve inches upwards. In the first Florida year observations were made with good results about 150 times, during which all the varieties of soaring birds of 100 miles of coast line were viewed. The trees of the country are short and stunted, and easily climbed, and a little search was rewarded by the discovery of thick sturdy tops in which a secure lodgment could be had. The birds abounded in prodigious numbers, thousands occupying a single roosting-ground. Not only was it seen that there was no motion of the wing as a whole, but that there was none of the individual feathers. There was no tremor, no slow nor fast waving; the entire bird moved when the wing did. When the wing was flapped there was no doubt about it, and the flapping could be seen as far almost as the bird was visible. Both the "soaring" and flapping were discoverable when they occurred beyond any doubt whatever. To determine horizontality of the sea-breezes of the coast, a radial arm, feathered and balanced level, was used. It is evident that somewhere in the interior of the peninsula there must be an upward trend of the meeting winds from the Atlantic and Gulf, but there is none discoverable on the western coast. The wind, twenty-five feet above tide, moves uniformly on level lines, and ten feet above the forest tree-tops no upward flow can be found. The lantern of Egmont Light, 150 feet high, at the entrance of Tampa Bay, was frequently used for these atmospheric observations.

There is a wide range in the relation between weight of bird and wing-surface in the different species. It varies from less than one to more than two feet for each pound weight. Uniformly the longer the wing to a given weight the greater the power of translation possessed by the bird, the "man-of-war hawks," in this respect, surpassing all others. Wide, short wings were coupled with heavy bodies, as in the Gannets, and these exhibited slower but steadier flight. The heavier the bird the steadier and easier seemed its movements, and a hungry Vulture, which was very shaky in the breeze, could ride serenely when gorged with carrion.

The only peculiarities discoverable in the atmospheric condition required for soaring, was that the wind in all cases should

move against the bird. The maximum velocity of this meeting of bird and air is unknown to me. I have timed the flight of Frigate-birds through calm air on fixed wings at 100 miles per hour, and their velocity seems to depend on their wishes more than on any limitation of the powers of translation. The minimum speed, however, can be approximated. For the Frigate-bird it is about two miles per hour, three for the Buzzards, and five for the Gannets. The heavier the bird the greater is the minimum velocity required, and a gorged Vulture cannot range itself with a flock of hungry ones, which are sporting in their minimum, without repeatedly flapping its wings.

As soaring is a phenomenon dependent entirely on bird and air, which are not connected with the earth, to avoid confusion it is best to pay no attention to the latter. For instance, a bird motionless in regard to a point on the earth facing a five-mile-per-hour breeze; the same bird moving in calm air at the rate of five miles per hour, or going with the wind at the rate of ten miles per hour, are identical in character so far as soaring is concerned. In each case the wind is meeting the bird at the rate of five miles per hour, and the differences of translation over the earth are accidental, not connected with the mechanical activities of flight.

A bird resting in a minimum breeze cannot fall to the rear without descending; neither can it rise vertically nor at any angle obliquely to the rear. It can draw forward on the air at any speed, and, when the minimum is exceeded, can then fall to the rear or rise until the minimum is once more reached. At the minimum velocity the bird's wings are stretched to their extreme limit, and the angle of inclination is the greatest. As the breeze stiffens, the bird, if it remains in the same place, flexes its pinions and reduces its incline. The Frigate-bird will float in a storm with not more than one-quarter of its wing-surfaces exposed. Sometimes it bends the points of its wings downwards until they meet underneath.

The positions of the stretched wings in regard to a level with the body of the bird also varies. Those of the Frigate-bird will average level, the Buzzards will be above, and the Gannets below a level.

For at least three hundred days in the year these birds could be observed in the air, and when the attention was given to their actions for a considerable time, at all seasons, and in the various

situations found on so varied a coast as that between Tampa Bay and the Capes of Florida, not only the habitual methods common to ordinary soaring flight, but the unusual ones, incidentally performed to meet some emergency, were witnessed. The birds also have periodic seasons of feeling, which puts them on behaviour that in a man would be thought idiotic. The months of February and March, the time of breeding, are prolific in these singular air-tumbling performances. They served to emphasize the complete difference between active and fixed wing-flight.

Being informed by parties from Charlotte's Harbour that Sand-hill Cranes could be found there, I set out in search of them. An outside passage of thirty miles was required, which was safely made, and at nightfall I was among the Gasparilla Keys. The wind being favourable and the weather fair, I kept on the outer beach, and at length drifted through a pass with the swiftly running tide in company with innumerable Sharks, Porpoises, and fish, great and small, all headed for the bay. Rounding the point I threw over the anchor, and, enveloped in a blanket with face towards the stars, slept, as one who manages a small boat for twenty hours can sleep. About daylight I was awakened by the thumping of the mast against the limb of a stunted cedar-tree obliquely jutting from the bank, and while adjusting the trouble a well-known cry sounded far above in the air, which at once banished all desire to sleep. I knew the note quite well. It denoted the arrival of Sandhill or Whooping Cranes from the north. Twenty-five years before I had seen them on the western prairies lift themselves on fixed wings above the clouds, and I had no doubt but what the call proceeded from birds which had the evening before been in the region of the great lakes on our northern boundary. Before sunrise at least fifty had arrived, and were greeted by their comrades on the land in the interior of the Key. They came down in great circles from a height of not less than three miles, on tensely-stretched wings, until within two hundred feet of the earth, when they suddenly began a slow flapping, which continued to the ground. I had often seen them begin their migrations, but never before witnessed the ending. They would average a weight of ten pounds, with about eight square feet of wing-surface. In rising they slowly beat the air until a suitable elevation is reached, when they assume a fixed position, and continue their upward flight in great circles to a

high altitude, when they swing off at a tangent for the south. I have never seen one of these birds move its wings after stopping them in its ascent, until they had arrived at the same level in alighting.

The Buzzards were the best species for observation from the ground. Their patience was simply inexhaustible. I watched a small flock of these birds for fourteen consecutive hours while they floated in the breeze, waiting my removal from a dead Porpoise stranded on the beach. Nothing could surpass the loveliness of the day nor the bland freshness of the incoming breeze. The birds would average eight feet in spread of wings, would weigh six pounds, and have about six square feet of wing-surface. A memorandum-book was filled with notes of the day's experience. About a score of flaps were made between twelve and three o'clock in the afternoon, when the wind was quite active and filled with flaws. From four to six in the evening they were as motionless as if petrified. As the sun disappeared behind the waters of the Gulf I ended the hardest day's work I ever made, and was not fifty feet away before every bird had its beak in the carcase. For several days after this really imprudent exertion of the attention I was abed, but on resuming the subject determined to try an experiment. Before my eyes, assisted by a very good glass, several bodies, of six pounds weight each, had remained stationary in free air about thirty feet above the water, absolutely without any visible support. They had remained in that condition many hours, facing a breeze of velocity varying from five to twenty-five miles per hour. In the rear was located my device for determining horizontality of wind, and it was level the entire day. Most people would be less surprised at a body resting in this way in calm air than in wind. They would hold each to be simply impossible, but more mysterious that both gravity and air-resistance should be ignored than simply gravity. So to determine how much force it would take to keep six pounds in air all the time unsupported I provided a billet of wood of that weight, well rounded, and proceeded to throw it up in still air, and the moment it came down catch and return it. The work was honestly done; the moment it descended it was tossed back with all the activity I was capable of commanding. I prefer that each one should try this for themselves, and will only say that an hour of such work was far, very far, beyond my muscular capacity.

These birds were often watched from a perch in some lonely tree at the water-line. That I could recline at ease in the fragrant foliage of the pine was easily accounted for; the trunk of the sturdy tree antagonised the gravitating force of my body, and I could rest at peace. But what held up the birds? Had gravity ceased to act upon them? Had they no resistance to offer to that sea-born breeze?

After about four years of this kind of work accident favoured me. A summer whirlwind, on a calm morning, issued from among the lemon-trees straggling over the point a few hundred yards below, and, clutching an armful of dead leaves, made for the bay obliquely in front of my station in the tree. A pair of Buzzards were returning from the outer beach on fixed wings, and, as luck would have it, were intercepted by the cyclone; and in five seconds were ducked in the waters of the bay. I hope they possessed a sense of humour, but they seemed to blame me for the mishap. A more thoroughly laughable episode I never witnessed, and from the bottom of my heart forgave the creatures for their seeming injustice. They abandoned that part of the coast, but left their secret behind them. For the purposes of this paper enough has now been said as to the facts exhibited. It is very evident that a state of things has been found to exist which calls for something better than guesswork in way of explanation. Taking the case of a ten-pound bird with tensely-stretched and motionless wings, facing a breeze anywhere from two to one hundred miles per hour, and resting serenely over the same spot of earth, without effort and without fatigue, we find our habitual notions about the difficulty of keeping unsupported substances in the air at fault. We want a solution of the matter from the standpoint of the mechanical engineer. We need not go into the domain of molecular physics for answers, but we wish the bird explained in the same way that the steam-engine is explained when we examine it as a machine doing work. To this end we may ask three questions, and, satisfactory answers being found thereto, the phenomenon will be comprehended:—(1) From whence is derived the motive power to balance gravity? (2) From whence is derived the motive power to hold the bird against the wind? (3) How are these forces applied? To explain a steam-engine in this same sense but two questions demand answer:—(1) From whence comes the motive power to drive the piston? (2) How is this force applied?

When we say that the force which moves the engine comes from the coal that is burning in the furnace, and is conducted through pipes by the medium of steam to a movable piston which it sets in motion, we have in a general way given an explanation to the activities there going on. When we say that the grindstone is operated by the force derived from the muscular organisation of the boy turning it, then its action is also explained briefly.

It is in this way that an attempt will be made to explain a soaring bird. No objection is taken to the view that force cannot produce motion, held by some recent scientists. Granted that nothing but motion can produce motion, and then I am only concerned with the sequence of events; with having it understood that the motion of the piston is not the cause of the burning coal, nor that the grindstone turns the boy.

When the trifling tornado struck the birds, as above related, the mechanical activities going on between bird and air were thrown into confusion, and the gravitating force of the bird's mass instantly carried it to the water. It was evident that the internal adjustments to enviroing conditions, going on through a line of ancestry reaching to the Reptiles of the secondary age, omitted summer cyclones. They were too rare to count. It was also pretty clear that the gravity of the bird's mass was the source of the entire motive power concerned in the act of soaring.

Were we dealing with wind-mills, sailing-vessels, tornadoes, or any other phenomenon in which the air was one factor and a body connected with the earth the other, the force would properly be spoken of as coming from the air. The amount of force would vary with the velocity of the wind. The work done would be referred to the mechanical agency which set the air in motion. But a body suspended in free air is part of the atmosphere, and at rest with it, unless it employs some activity not derived from it. The same mechanical agent which moves the air equally moves the body. The active birds derive the force to move themselves in the air from their muscular efforts, the soaring birds from gravity. Gravity gives *all* the motive power—that which antagonises itself and that which antagonises air-resistance.

The case is analogous to that of a man on a moving train of cars. He is at rest with the train throughout, unless he employs muscular power to set up motion with it. All activity between

man and car is due to the man's force, and not to the train's force. This force works a pair of legs, which set up motion. Gravity works in a different way. It requires a device which compresses air, as found in the soaring birds.

Notice also that the mechanical action known as "soaring" takes place only between the minimum and maximum velocities with which body and air meet. An initial impulse is required in all cases to carry the body within those limits. In a calm the body would have to be pushed on the air until the minimum was reached. In a breeze it would be forcibly held to reach the same result. The first impulse resembles pushing an engine off of the dead centre. It simply starts the machine. It has nothing whatever to do with its continuous running. Once within the limits of "soaring," the gravitating force of the body gives a liberal supply of power for all the purposes of air-navigation.

Let us suppose the wing-surfaces to be twelve inches in width, and the bird to weigh ten pounds, with wing-expanse sufficient to soar in wind moving at the rate of thirty feet per second horizontally. Why does not the body fall? It is true that there is a stiff wind moving against it horizontally; but the gravitating force is vertical, and can be in no way influenced by a horizontal force. The ball shot from a level cannon falls precisely as fast as one dropped from the mouth of the gun. It is evident that the body is indifferent to the horizontal air. This does not act upon it at all. No particle of air influences it but what is in contact with its surface, and the instant it is in contact it ceases to be horizontal, being deflected in numberless different directions. In a strict sense, in a sense which alone represents the true character of this phenomenon, the air can only be considered as quiescent in every case of soaring. In every case the air is a dead calm until it comes in actual contact with the body, and the movement of the body in the air is a consequence of force derived from the body, and not from the air. It is a parallel case with the boy and grindstone. From the reciprocal nature of action and reaction, the air is doing as much work on the bird as the latter is on the air. The grindstone is doing as much work on the boy as he is on the grindstone, still it would never do to say that the latter turned the boy.

If gravity, then, be the motive power of a soaring bird, how does it act to produce the results? Vertically downwards towards

the centre of the earth, precisely as it does in all other cases, and the reason that the body manifesting it does not get lower is because something is pushing up against the under surface, just hard enough to balance the weight. It may be hard to follow all the peculiarities of the disturbances going on under the bird, but it is certain that they serve to hold it up. They are mainly condensations of air upon which the body is falling, and are equal to ten pounds in each foot of air passing to the rear. This ten pounds of force is moving at the rate of thirty feet per second, as we assumed at the start, and it follows that an amount capable of holding up 300 pounds each second is passing the rear edge of the bird's wings, and is wasted in falling to the tension of the surrounding air. .

But this is not all the force of disturbance which passes to the rear. The reactions against air-resistance also go there. These, like the others, consist in condensations, accelerations, and deflections. According to the law of the composition and resolution of forces, they bear the same relation to the vertical disturbances which the height of the incline bears to the base, or, in other words, they are to each other as the angle of inclination of the revolving planes. Supposing in this case the height to be one-fifth the base, there would be 360 pounds of force passing the bird's wing each second. Gravity puts in 300 pounds, and gets itself supported in doing it. The weight is thus balanced; but we are employing an external force of sixty pounds to push the body on the air. By the law of the action of elastic fluids under pressure, when the condensed air passes the rear edge of the wing-surfaces it expands in all directions, and consequently upwards and forwards on that edge. If sixty pounds of the whole 360 expanding is thus thrown forwards, it will balance air-resistance, and the total power to produce the soaring phenomenon will be the weight of the bird. It only requires one-sixth of the whole force on hand to do it. If this can be utilised by wasting the other five-sixths, the task is accomplished. There would be waste in eddies and side-currents, so that in reality there would be less than the total force of disturbance passing to the rear. Allowance may be freely made for all wastage, and sufficient will remain to perform the desired service. Experiment shows that in very critical tests the result can be attained without the rear-expansion. It may be held that each molecule of air as

it is struck by the plane is, to some extent, carried with it, as well as condensed, while those below are at rest. Thus a rotary motion may be supposed to take place on the entire lower surface, when the air-resistant factor would be neutralised by the excess of gravity in each molecule, instead of at the rear edge.

It has been objected that this is a disguised form of "perpetual motion." Remember that there is a great difference between heaping absurdity on a thing and finding absurdity in it. It is urged that gravity can only do work by the fall of the body manifesting it, and that in this case it does not fall; that there is no sacrifice of its energy of position, and hence it cannot do work. This is true of actions in which the earth, or anything fast to or supported by it, is a part, and the gravitating body another part; and it is true in the sense that the word "fall" means getting nearer the earth. But this is not true with soaring, nor with allied phenomena, and I will illustrate the matter by an example. Suppose that our hypothetical bird rest in the air in a horizontal position, and that the wind moves vertically upwards against it at the rate of twenty feet per second. To get the attention on the significant features of the case, we will suppose the bird to weigh the same as the air which it displaces, thus obliterating the gravity factor. It will then have no motion with respect to the air, but will move with it. In this condition it is not a falling body, and is doing no work. It is simply a body resting motionless in air. We will now suppose ten pounds of weight to be added to it. It instantly becomes a gravitating body doing work on the air. Its motion is accelerated until a velocity is reached at which the work done on the air is equal to the force doing it, when its motion becomes uniform. Suppose this to be twenty feet per second. What have we? A case precisely analogous to that of a soaring bird, which is a falling body doing work on the air without losing its energy of position. Its "fall" is properly related, in a strictly scientific sense, to that upon which it is moving, and upon which it is doing work. In relation to the earth, or the moon, or the seven stars, it may be at rest, as they are not even remotely concerned in the matter.

A soaring bird may therefore be considered a machine for distributing air. The motive power required for driving the mechanism is its gravitating force. Its effectiveness consists in

the amount of disturbance which returns to the normal condition of the surrounding atmosphere.

There are two peculiarities connected with its action, which may be considered accidental, or rather incidental, which deserve attention, for they are of the first importance in all questions relating to artificial air-navigation. One of them is, that the material upon which the machine does work becomes the frame which supports it, and which is not connected with the earth in any way. The other is, that while the motion of the device is in all cases in two directions on the air upon which it operates, *viz.*, in the direction of the gravitating force, and at right angles to it, in respect to the earth's surface its motion is in any direction whatever indifferently. These two unique characteristics of soaring constitute its value for artificial use. They are the results of the action of an inclined plane driven on air, and meet the requirements of atmospheric translation completely, so far as the direction of motion and supply of motive power is concerned. It effectually disposes of balloons to antagonise gravity, and of motors to drive the machine against the air. Two requirements are still needed. The device must be steered and kept in position. When it is remembered that the rear expansion drives the bird forward, any change in the extent or position of one wing which is not shared by the other would retard or accelerate the motion of the changed side relatively to the other, and serve to determine the direction of motion. A balance still needs to be preserved. The bird gives significant hints also. The heavier it is the steadier is its motion, and a device large enough to sustain the weight of a man may be qualified by its inertia to assist in preserving its own equipoise.

The most important points of this subject have now been given. Experiments with artificially-induced currents of air, requiring a steam-engine to be transported to the sands of Florida, were expensive, and productive of only negative results. Much time and means were wasted in this way, and all my efforts previous to the summer cyclone above recited seemed abortive, excepting in the settlement of the facts of soaring as shown by the birds. The moment the idea that gravity was the motive power, and not the air, was entertained, the whole matter became luminous. No steps subsequently taken have been in the wrong direction, and I shall return to the prosecution of the subject the moment prudence permits.

The relation of the soaring birds to artificial air-navigation fills the whole subject with a sort of pathos. A Turkey-buzzard, most despised of all the birds, employs mechanical activities by using a device of such simplicity that, compared to it, a common grindstone is a complex machine, for the purposes of air-locomotion in the search for carrion, with conspicuous and complete success, itself being a working model of the very thing which man has worked, and sweated, and died to possess, and he has never seen it! For a period of time coëval with his own existence on this planet this thing has been going on, and the world is full of it now; and still the mature conviction of both common-sense and Science is—that it is impossible.

NOTES AND QUERIES.

MAMMALIA.

Variation of Colour in the Squirrel.—As the habits and colouring of the Squirrel have been discussed a good deal lately, I take the opportunity to mention a few observations I have made. I think Mr. Aplin is right in saying that in some cases the white or light tail is only an individual peculiarity, for on two occasions I have come across nests of young Squirrels, all of which had the tail light-coloured; while one of the parents, in each case, was of the ordinary colour, with a red tail. In Savernake Forest, Wilts, the light-tailed Squirrels seemed to inhabit a regular district, and in this part of the forest I think I hardly ever saw one without a light tail, though they were apparently of all ages. I supposed this to be due in some way to their food. I may mention that the young light-tailed Squirrels had not got light-coloured ears.—A. H. MACPHERSON (51, Gloucester Place, Hyde Park).

Otters near Salisbury.—As there is much interest taken in our few remaining wild animals, the notes I have by me concerning the frequent occurrence of the Otter in this neighbourhood during the last two years may be of interest to the readers of 'The Zoologist.' I can enumerate more than a score of instances happening since the autumn of 1884, and additional proofs, if any were wanted, that the autumn is the usual time for them to drop their young, though perhaps they vary in this respect more than any other animal. On October 8th, 1884, I heard that one of our men, in cutting the sedge by the river-side, had come across three little Otters, newly born, which he had killed and thrown down

on the bank where he had found them. On the next morning I sent for them, and had them preserved to put into an Otter-case in my collection. They were some five or six inches long, quite blind, and covered with soft downy hair, and could not have been more than two or three days old. On March 21st, 1885, the gardener at "The Moat," which has some ornamental water surrounding it, caught a young Otter alive there. On going to see it, I found it to be four or five months old; and during the few days he kept it, it grew comparatively tame, and would eat its boiled eel without fear, while we were watching it. This Otter, I should think, must have been born about the same time as those above mentioned; so that there must have been two litters of them in our meadows at the same time close to one another. The same evening a young Otter was heard crying in "The Moat" water. As there seemed so many about, the keeper thought to try and shoot the old ones; so that evening, at dusk, he tethered the young one on the middle of "The Moat" lawn, and waited to see if either of the old ones would come to it. He had not waited long before the young one began to cry out sharply, and shortly after one of the old ones appeared, and ran directly across the lawn to where the young one was tethered. The night was so dark, however, that the keeper could not distinguish it properly, and apparently missed it altogether, for it was met not long after making straight for the river by another man, who was nearly thrown down by it, as it ran almost between his legs. I ran out on hearing the shot, and heard the old Otter blowing and snorting on the bank, evidently in anger and fear, but with no accent of pain in the noise it made. The old ones were not seen again. I wrote to the Zoological Society about the young one, and they purchased it; but I am sorry to say it only survived about a fortnight, though it appeared perfectly healthy. On April 23rd I went out to see the Otter-hounds from Cumberland, which were making a week's sojourn in our neighbourhood at Amesbury. We tried the river higher up by Nether-Avon, at Figheldean, but, though the hounds owned the drag of the Otter more than once, we did not actually find. It was indeed asserted by an excited sportsman that he saw the Otter dive off the bank immediately in front of him, but the dogs would in no way own the scent at the spot pointed out by him; and it was no doubt the splash of a moorhen from the bank that had deceived his excited nerves. On the following Saturday, however, at Porton, some six miles east of Salisbury, the hounds had a very successful day, killing two Otters of considerable size. During last summer one of the agricultural students at the college at Downton, some six miles from here, was taking a stroll by the river with his gun, when his attention was attracted by a scuffling in a thick bed of sedges close to him. He remained perfectly quiet, and

presently a fine dog Otter emerged from the rushes, evidently having had the worst in a determined battle with another of his own sex. This one was immediately secured by the sportsman with his first barrel, and immediately after a second made his appearance, which also received his quietus from the second barrel. Each of them, I believe, scaled over 20 lbs. By the keeper's house in the parish a small back stream wends its way to the river hard by, being sheltered by the high hedge of the garden on the one side and by a large faggot-pile on the other, the pile consisting of large logs of timber reaching some five or six feet off the ground, and some bundles of faggots laid on the top of them. One day in November last the keeper heard a curious squealing noise issuing from the pile, and at once divined the cause of it; and in the evening he and the gardener (who had before caught the young Otter alive) set to work and began to pull the pile to pieces to prove the cause of the noise. They had only taken off the uppermost of the faggots when they found three young Otters deposited in a snug little receptacle on the first of the layer of faggots above the timber, some five feet or more above the ground. These they killed, as they were too young to keep, and then proceeded to pull the pile to pieces altogether; and, just before they came to the log nearest the ground, both the old Otters bolted into the water, and though fired at, at very close quarters, they escaped safely down the small stream into the main one. The dog Otter was said to be a very large one indeed, and to have been in our parish for some five or six years; and I am glad to think he is a parishioner still. The instances I have already enumerated will serve to show that the species is not by any means likely to become extinct in our immediate neighbourhood, as our river, the Christchurch Avon, is too deep for hounds to have any real chance of killing them. They are so wary that it is only an occasional one now and then that can be trapped, and, though they have been rather unlucky of late in this parish as to the localities they have chosen in which to deposit their young, yet quite enough remain to keep up the breed for many a long year. I do not suppose, during the twenty-five years I have been in this parish, that a single year has elapsed without one or two instances of their capture having been recorded amongst us. I will not occupy more space in recording instances of their occurrence, except to mention the specimens which have passed through the hands of our local taxidermist, Mr. White, of Fisherton, since the month of August last. During August a fine dog Otter was brought to him for preservation, which had been shot near Codford, weight 25 lbs.; on Sept. 8th, a female, weight 18 lbs., also shot near Swallowcliffe. During the same month another dog Otter was brought in, shot at Sandhill, near Fordingbridge, and a fourth, also a male, weight 25 lbs., from Woodford. In the month of October two young males were brought in from the village of Dinton, above 4 lbs. each; and in November two others about the same weight were

caught in the immediate neighbourhood, a larger one, also a male of 16 lbs., being brought in about the same time, which had been trapped not far from our city; and besides these another pair of young ones, a male and female, reached Mr. White's hands not long after the others I have mentioned. Thus no less than eleven have been sent in for preservation, all more or less from our immediate neighbourhood, since the month of August last, which shows that they are still able to hold their own amongst us. Nay, their numbers are such that they are more likely to cause an irrational fear in weak minds, for on showing the young Otter which had been caught alive to one of my servants, and, at the same time, an old dog Fox, which had on the same day been picked up dead in the parish after a sharp run, she exclaimed, "Lor, sir, I had no idea that there were such creatures about the place! I shall be really now afraid to go out after dark."—ARTHUR P. MORRES (Britford Vicarage, Salisbury).

[We think it very much to be regretted that those in the position of our correspondent, whom we know to be an excellent naturalist, do not use their influence to check the indiscriminate slaughter which is going on of so-called rare animals. Anything more wanton than the destruction of Otters above described, especially of the young ones, which were killed "because they were too young to keep," it would be difficult to conceive. The irrational course adopted by those who pride themselves upon having helped to make a rare animal still rarer by killing every specimen they meet with, is to us inexplicable. We have no objection to Otters being hunted with hounds in a legitimate and sportsman-like manner, because then they have a chance for their lives in an element in which they are much more at home than their pursuers; but we do protest against their being slaughtered in cold blood, or shot at and wounded, whenever they show themselves; and especially do we protest against the unfeeling destruction of the helpless young.—ED.]

The Carnivora of Finland.—How great are still the numbers of carnivorous animals in Finland may be seen from the following figures, given in the last issue of the 'Statistical Yearbook' for Finland:—In 1882 not less than 85 bears, 128 wolves, 407 lynxes, 4005 foxes, 76 gluttons, 240 river otters, 148 martens, 1583 ermines, and 3947 birds of prey were killed, for which the sum of £1646 was paid in premiums by the Government. The ravages occasioned by Carnivora the same year were immense; they are estimated at 274 horses, 846 horned cattle, 5246 sheep, 168 pigs, 119 goats, 1681 reindeer, and 2366 domestic fowls. The greatest number of bears were killed in Viborg and Uleaborg (respectively 33 and 30), whilst most wolves were killed in the more densely-peopled Government of Tavastehus.

Sowerby's Whale on the Yorkshire Coast.—At the meeting of the British Association in September last Professor Turner read a paper on the

occurrence of Sowerby's Whale (*Mesoplodon bidens*) in Shetland, with special reference to the anatomy of the specimen which was dissected and examined by him (Zool. 1885, p. 430). Curiously enough, on the very day on which this paper was read (Sept. 11th), another specimen of this Whale was stranded in shallow water just inside Spurn Head, at a spot known as the Chalk Bank, and was attacked by men in boats, and eventually killed and cut up for the sake of the oil. Unfortunately the remains were allowed to drift out to sea, and were lost beyond possibility of recovery before they could be examined by any competent naturalist. Messrs. Southwell and Eagle Clarke, however, have been at the pains to collect all the information possible, including approximate measurements, from eye-witnesses of the capture, and have published the details in the 'Annals and Magazine of Natural History' for January, 1886 (pp. 53-59). They conclude their remarks with a list of all the specimens (fifteen in number) of this Whale which are known to have been met with since the first recognised example was obtained on the coast of Elginshire in 1800.

BIRDS.

Porphyrio chloronotus and P. cæruleus in the British Isles.—The Greenbacked Porphyrio (*Porphyrio chloronotus*), shot at Horning, in Norfolk, recorded by Mr. Gunn (Zool. 1884, p. 482), is a good specimen, showing not the slightest sign of confinement; but I imagine it is not adult, as the back is not so bright as in one shot some years ago at Barton. I cannot understand why these birds should be always supposed to have escaped, never having heard of anyone in the eastern counties, except ourselves and Mr. Stevenson, who kept them in confinement. They are just as capable of migrating as a Moorhen; moreover, they are migrants in Egypt, and the Purple Gallinule (*P. cæruleus*, *P. veterum* (auct.)) is a known migrant in Spain. I believe I am correct in saying that neither of these species has been as often brought alive to this country as their black-backed ally from Australia (*P. melanotus*), which has never been killed at large. Mr. Gunn's specimen was obtained in the "Broad" district, within a few miles of Barton Broad, where two occurred, and what is very remarkable, they were shot within two hundred yards of the same place. Knowing how often history repeats itself in the matter of rare birds, I think, if this circumstance is viewed fairly, it is very much in favour of these Porphyrios—(which were shot respectively in November, 1877, and August, 1879)—being wild ones. Two or three years ago one of the species under consideration—*P. chloronotus*—was brought into Plymouth, having been taken on board a ship, but in what latitude is not known, and was taken alive to Mr. John Gatcombe, from whom I had this information. It was clearly migrating, and might very likely have reached our shores. Audubon says that, while at the island at Galveston, Texas, he was offered several Martinique Gallinules,—

a well-known South-American species (*Porphyrio martinicus*, Linn.),—by the officers of the 'Boston' frigate, which they had caught on board; and that his friend John Bachmann had received three, which had been caught three hundred miles from land! (Orn. Biog. iv. p. 40). Similar testimony is given in 'North American Birds,' by Baird, Brewer, and Ridgway (vol. i. p. 385). If American Porphyrios are capable of such extended flights, there can be nothing very remarkable in any member of the genus coming to England, their wings having evidently ample power to sustain their bodies in flight. Of the fourteen Porphyrios which have occurred in the British Isles, all but two have occurred in the autumn, the season of all others when we expect rare migratory birds. This in itself is very strong evidence. *P. chloronotus* has occurred on different occasions in Italy and in the South of France, as might be expected: they may have escaped, but we can look with less suspicion on our British ones from the fact of their having occurred also in the intervening countries.—J. H. GURNEY, jun. (Northrepps, Norwich).

Swallow in Co. Sligo in November.—On Nov. 18th, when walking along the shore here at Moyview, I was surprised at seeing a Swallow (a bird of the year) flying about quite lively, notwithstanding the cold weather of that and the three preceding days, when the thermometer indicated an intensity of cold varying from one to six degrees of frost; and on that very morning when the bird was seen the mercury had fallen to twenty-six degrees at half-past seven o'clock. How a Swallow could have existed so long is a mystery, for surely there could have been no food of any sort to be obtained in such a temperature. — ROBERT WARREN (Moyview, Ballina, Co. Mayo).

Variety of the Fieldfare.—I lately examined a pied variety of the Fieldfare, which is so distinctly marked that I think it worth notice. The crown, sides of the head, and neck are white, in some places mixed with a few grey feathers. In one of the wings, the first secondary feather and one or two of the lesser wing-coverts are white, whilst on the other wing one of the greater wing-coverts only is white. The claws, too, are peculiar, having pale bases; otherwise the general coloration is similar to the ordinary male bird. It may be seen with Mr. Allen, bird-preserved, in Feasgate, to whom it was brought from the neighbourhood of York.—J. BACKHOUSE, jun. (West Bank, York).

Winter Nests.—In October I noticed a pair of Sparrows building a roosting nest on the foundation of a spring nest in the top of a pear tree. It was built of hay, and not lined, and the hole in the side seemed to be larger than the hole in an ordinary spring nest. Three birds often appeared at roosting time. I have often observed Sparrows carrying straws into holes in buildings in November. The Wren is known to build roosting

nests, and Rooks may often be seen to repair their nests in autumn. Can anyone give a list of British birds that have been noticed to build or repair nests in autumn?—GEORGE ROBERTS (Lofthouse, Wakefield).

Variation of Plumage in the Corvidæ.—*A propos* to Mr. Theobald's note (Zool. 1885, p. 437) on albino and mottled birds, I may mention that some time ago I saw a Carrion Crow with a white tip to each wing. This was near the town of Bludenz, in the Vorarlberg. Shortly afterwards I observed another Crow, of which only one wing was tipped with white. So far as I can ascertain, albinos or particoloured specimens of this bird are of less frequent occurrence than those of the Jackdaw or Rook.—G. N. DOUGLASS (Bismark Street, Karlsruhe, Baden).

Spoonbill in Co. Kerry.—In a letter of the 14th November last the Rev. Alexander Delap (the Parsonage, Volunteer Island), informed me that a fine specimen of the Spoonbill was shot a few days previously in the harbour there. From the good description given of the plumage the bird was evidently adult.—ROBERT WARREN (Moyview, Ballina, Co. Mayo).

Emberiza melanocephala in Nottinghamshire.—I have in my possession a specimen of the continental Black-headed Bunting, *Emberiza melanocephala*, which was given to me in June or July, 1884, by Mr. Stanley, taxidermist, of Trent Street, Nottingham. This bird was brought to him in the flesh, about the date mentioned, by a man who stated that he had just shot it between Radcliffe and Bingham, in this county. I did not, when I first saw it, know what bird it was, but it has since been identified by Professor Newton, and by Mr. Whitaker, of Rainworth, who both consider its occurrence (I believe for the second time in England) worth recording.—J. RHODES ASHWORTH (The Hutt, Newstead, Nottingham).

[This bird, which is not to be confounded with the Reed Bunting, also known as the Black-headed Bunting, *Emberiza schæniclus*, was first noticed as a rare straggler to England from the European continent by the late Mr. Gould, who, in 'The Ibis' for 1869 (p. 128), reported the capture of a specimen near Brighton, in November, 1868. The species has since been described and figured in the 4th edition of Yarrell's 'British Birds,' vol. ii., p. 64.—ED.]

Glaucous Gull in Skye.—On Dec. 22nd I received a specimen of *Larus glaucus*, obtained in Skye, near Dunvegan, on Dec. 14th. It was an immature bird, and proved to be a female, as the total length of 28 in. and the wing measurement of 16½ in. had led me to anticipate. It was in good condition, the stomach being crammed with the remains of small fishes. When shot it was in company with a larger bird of the same species.—H. A. MACPHERSON (3, Hargrave Road, Upper Holloway).

Notes on Wildfowl in Yorkshire.—Amidst several hundred Mallard, and a few Teal, Widgeon, Tufts, and Pochards (some of the last two bred

from pinioned parents), there are, on the water in this park, two wild Goldeneyes, an immature male and a female, and a fine old female Scaup, which have been here more than twelve months. The Scaup paired with a pinioned male, but, though she remained here, did not nest, as I thought possible. These wild Goldeneyes and the Scaup in hard weather, with other pinioned birds of their kinds, have often dived for maize within half a gun-shot of where I was standing. There is also here a fine wild Greylag, which I first saw on Christmas Day. He was then in company with some tamed Wild Geese of different species, but on the following day he was seen standing away from the others in the most open part of the park. I have full-winged Bean Geese, White-fronted, Pink-footed, and Canada Geese, which seem quite reconciled to the place; but Brent Geese always leave me as soon as their feathers grow. A pair of full-winged Bean Geese nested here last summer. Half the eggs I left with the old goose; the others I placed under a hen. All were addled, except one, from which the hen hatched and reared a fine gosling. These Bean Geese are fairly tame, and will fly to me whenever they expect food, though, from their shabby plumage when I got them two years ago, I considered them wild-caught birds, their flight-feathers being worn down to the stumps, as I have seen in other wildfowl which have been netted and sent over in large quantities from the Continent. I feel certain that a pair of my pinioned Goldeneyes nested here last summer, though I could not discover the nest. The duck disappeared for several weeks in July (I have mislaid my notes giving exact dates), only joining the drake for a short time in the afternoon or evening, when his welcome on her approach, and her hurried way of washing and feeding, left no doubt in my mind that they had a nest in a thick plantation, into which she used to vanish, swimming up a stream that flows through it. After several weeks she ceased to appear at all, and I think must have been taken by a fox, or have died, perhaps, on her nest, as the drake remained on the same pool. I had put up boxes for them, but they were not used by the Goldeneyes, though one was occupied by a Mandarin Drake and a Carolina Duck, both full-winged. Their eggs, which I took, proved addled.—W. H. ST. QUENTIN (Scampston Hall, York).

The Black Redstart in London.—Towards the end of November last, a Black Redstart (*Ruticilla tithys*) made its appearance in the grounds of the Natural History Museum at South Kensington, and remained there until the snow covered the ground on January 8th. It was frequently seen from the windows of the ground-floor rooms, either perched on the railings within a few yards of the windows, or flitting about amongst the shrubs in company with Sparrows and occasionally a Blue Tit. To the credit of the authorities be it said, no attempt was made to convert it into "a specimen" for the British collection, and had it not been for the snow in all probability

the bird would have made a longer stay. It probably succumbed to the cold, or perished from inability to procure proper food.—J. E. HARTING.

Notes from Merionethshire.—Last summer I took a few notes on the birds which I saw in a part of North Wales which is not much frequented, and I hope they may prove of some interest to your readers. The house at which I stayed is about two miles south of Cader Idris, and in front of it, about two hundred yards away, is a little stream which divides the counties of Merioneth and Montgomery. There are a few Buzzards in the district, and on May 13th I took an addled egg from a nest which contained one young bird. It was in the first fork of an old oak, about six feet from the ground, and in it were a snake, a lizard, a mouse, a young blackbird, and half a rabbit. One of our quarrymen told me that he had found another nest with young in it on a rock, but I cannot vouch for the accuracy of this. On the same day I got Ring Ouzel's eggs very hard-set, and on May 14th I found a nest of this bird with young birds in it. On May 31st the quarryman, whom I have mentioned, brought me a young Ring Ouzel from a hill at the back of our house. It could fly well enough to give him a good chase. It seems therefore that these birds must breed here considerably earlier than they do further north, since it is mentioned, in the last edition of Yarrell's 'British Birds,' that Mr. Heysham saw young birds near Carlisle fully fledged on June 15th. The old birds kept flying close to the man till he had got almost to the bottom of the hill. I asked him to take the young bird back. He let it go a little way up the hill, and at its first cry the old ones flew to it in a moment. Grey Wagtails are common here. Two of their nests which I found were lined with white hairs only, and in all of them the lining was composed of lighter-coloured hairs than the rest of the nest. I often went to look at one of these birds sitting on her nest in a ledge of rock almost under a waterfall. There are several pairs of Dippers, and I think there would be many more if they did not build so much under bridges, where the boys easily find the nests and take the eggs for the sole purpose of breaking them. I could not find the eggs of the Common Sandpiper, though I saw several pairs of the birds, and caught four little ones among some rushes. On June 1st I saw and heard a Garden Warbler (*Sylvia hortensis*), and on June 3rd one began to sing in our garden, and continued to do so every day till I left. His favourite place was near the top of a Holm-path. I could not find the nest, though I was anxious to do so, as the bird is not common in Wales. There were several Blackcaps about us, and, on finding a nest in our garden, we hoped it was the Garden Warbler; but while I was taking an egg the parent bird stood on the side of the nest, and showed the unmistakable brown head of the hen Blackcap. Redstarts are very common, and we found many nests, one of them in a hole in a bank. The Pied Flycatcher (*Muscicapa atricapilla*) is by no means rare. We found

six nests of this bird; they are easily found, for the male is continually going to and fro while the female is sitting; and on one occasion there were two males in attendance. We took an egg from one of the nests without disturbing the bird, and she more than once allowed us to push her up from her eggs. This nest was in a hole in the rock on the hill-side, and another one we found in the root of a tree. Wood Wrens (*Ph. sibilatrix*) are, I think, in greater numbers than Willow Wrens (*Ph. trochilus*), and they are certainly more conspicuous. They sing chiefly in the oaks on the hill-sides, and, as the hills are very steep, you can get quite close to them by going rather higher up. We never came across their nests by chance, but we found two by watching the hen bird. The Chiffchaff was by far the scarcer bird of this genus. I only saw two pairs of Red-backed Shrikes; their eggs were beautiful specimens of the two varieties. Of all the summer migrants in this part of Wales, I think Tree Pipits and Wheatears are the most numerous, except perhaps Swifts, which build under the eaves of half the houses in the village. Ravens have built for many years in an old hole in our quarry. The farmers wage war against them, because they kill the lambs and the yearling ewes; but Cader Idris and the Bird Rock will keep the district supplied. Early in December I heard that a new pair had come about the old place in the quarry. There are always a few Curlews on the hills in summer, and I hope next season to go to a place a few miles off, where I am told several pairs breed. There are no game-keepers to destroy the Crows and Magpies, which rear their young quite close to the houses. I have never found Kestrels using their nests here; they seem to confine themselves to the rocks. Many of the common birds are absent; and I have only seen one Starling, and that was five miles from our valley.—F. H. BIRLEY (Dormans Land, East Grinstead).

Egyptian Geese on the River Taw.—Three Egyptian Geese have recently been killed on the River Taw, close to this town. Two were shot on Dec. 28th and one on Jan. 2nd. They were all three together when first seen; doubtless the third bird obtained was the one which got away when the first two were killed. From what I can gather from a boatman, who saw them approaching, they came from a north-westerly direction, and were going south or south-east; they were at a great height, but suddenly came down rapidly to the river not a quarter of a mile above the town. They are very fine specimens, and are being set up by Mr. Rowe, the bird-stuffer of this town. He informs me he has not had one of these birds for quite ten years.—JOSEPH HAMLING (The Close, Barnstaple).

King Eider at the Farne Islands.—On April 25th, 1885, an adult male King Eider, *Somateria spectabilis*, in good plumage, was shot. For several years a male of this rare visitor has been noticed at the Farnes; in 1881 and 1883, when I visited there, he was constantly seen, but was very wild and difficult to approach. He was frequently accompanied by two

ducks, one much darker in colour than the other, which was also considerably smaller; whether females of *spectabilis* or not it is impossible to say; they may have been only the Common Eider, *S. mollissima*. I exhibited this bird in the flesh at a meeting of the Birmingham Natural History Society on April 28th, 1885. The King Eider has been once previously obtained at the Farnes, one, formerly in the collection of F. Raine, of Durham, having been shot there November 13th, 1873.—R. W. CHASE (Edgbaston, Birmingham).

FISHES.

Sturgeon and Sting Ray at Hastings.—During the month of November last a large Sturgeon (*Acipenser sturio*) and a Sting Ray (*Raia pastinaca*) were caught by some fishermen of Hastings. The Sturgeon was taken in a draw-net off Rye; its length was six feet, and its weight ninety pounds. The dorsal plates were very pointed and prominent.—F. V. THEOBALD (Kingston).

MOLLUSCA.

A new List of British Marine Shells.—We have received a list of 'British Marine Shells, comprising those of the Brachiopoda and Mollusca (proper),' which has been compiled by Mr. A. Somerville, B.Sc., F.L.S. The arrangement followed is that of Gwyn Jeffrey's 'British Conchology,' and the list, so far as we have followed it (to the end of the Bivalves), appears to be almost a literal transcript from that work of the families, genera, and species, both in regard to their sequence and the names applied to them. The object of this catalogue, we presume, is to furnish collectors with a check-list, in which they can see at a glance the extent of any genus, or mark off on it such species as they possess or may still desire for their collections. For this purpose it will doubtless be found useful, and, had it been printed on one side of the paper only, and that white instead of tinted, it might also have been utilised for labelling. We have only so far noticed one omission from Gwyn Jeffrey's work, namely, *Neæra rostrata*; but we do not find that Mr. Somerville has included the new species described by that author from the 'Lightning' and 'Porcupine' Expeditions. Some of these species were dredged off the north of the Hebrides and the west of Ireland, and have as much claim to be considered British as several which are quoted in the list as only known from the Shetland Islands and other remote parts of the British Seas. One or two alterations might be suggested in case a second edition of the List should be published. For instance, it has been shown by Stoliczka and others that the term *Pelecypoda* has priority over *Lamellibranchiata*, and Philipsson (not Retzius) should be regarded as the author of *Crania*, as well as of *Unio* (*vide* Brit. Conch. vol. i. p. 31). We would also point out that some of the compiler's names might be differently abbreviated, for as they now stand they are too indefinite.

For example, "Han." for Hancock applies equally to Hanley; "Sch." for Schumacher might mean Schubert; and "Bro." for Brown might also be a contraction for Broderip or Brot. With these amendments, it seems to us, the utility of the list would be enhanced.

Observations on Marine Gastropoda. — I have many kinds of Mollusca in my aquaria, and am studying their habits, and also the causes which tend to produce variation in the forms and colours of their shells. The species are both freshwater and marine, but I shall confine myself in these notes to the latter, and of these shall only remark on the univalves. The most hardy are the specimens of *Littorina littorea*, of which I have a goodly number, in all stages of growth. This common and well-known species breeds very freely in confinement. The young shells are very different in shape to mature ones, being more tapering and slender, with proportionately longer spires. Their shells are brown and semi-transparent, and are several months before they begin to thicken. Possibly they may grow more slowly in an aquarium than in the sea, for some individuals which I specially observed were quite a year before they began to assume the normal shape of the adult. They seem to be long-lived, for one particular specimen, which I introduced into a vase when of a similar size to the average of those exposed for sale in fishmongers' shops, has lived in the aquarium for ten years. The shell has enormously thickened, and become of a greenish-white colour. Judging by the rate at which those have grown which I have had from the egg-state, its age when first introduced could not have been less than ten years, and probably more. It must, then, be upwards of twenty years old now. *Nassa reticulata* and *N. incrassata* I have little difficulty in keeping alive for a long time, although they never breed with me, to my great regret, as I much desire to watch the life-history of both these and other species. They like shallow water best, and spend much of their time out of it altogether, just as the periwinkles do. The food they prefer is a piece of dead mussel, and their sense of smell is evidently very keen, for they soon scent their rations. Their time for feeding is always night, and they are very quiet and apparently asleep in the daytime; but, by taking a light to the aquarium after dark, they may be observed awake and active. In default of a piece of mussel they will eat the flesh of a dead fish or some scraped meat. *Purpura lapillus*, on the contrary, can never be induced to touch the scraped meat I offer them, and I do not succeed in keeping them more than a few months. I have the same difficulty with *Buccinum undatum*. — ALBERT H. WATERS (Cambridge).

The Locality for *Limnæa involuta*, Thompson. — In the 'Journal of Conchology' for September last Mr. Wilfred Bendall writes as follows:—"Cromaglaun Mountain is seven miles from Killarney, on the road to Kenmare. There is no Cromaglaun Lake, as stated by some conchologists.

The tarn inhabited by *L. involuta* is called Lough Crincaum on the one-inch statute map. It is on a boggy plateau immediately under the apex of the mountain, which is a strictly preserved deer-forest. There is no path up, and the climb is a severe one. The pool is apparently not more than twenty feet across, and a quarter of it being situate close against the precipice of the upper mountain is inaccessible. My brother and I spent one hour and a half searching for specimens, but unsuccessfully. I heard afterwards they are only found under stones just where the stream runs out down the face of the mountain, but there are certainly none there at present, as neither the gamekeeper (who knows the shells well) nor ourselves could find them. Perhaps, owing to the unusual heat, they had retired into the mud in the middle of the pool." In the succeeding number (p. 355), Dr. W. H. Evans thus comments on this communication:—"In 'The Naturalist' for November, 1864, I wrote a short account of an ascent of Cromaglaun, and the capture of a dozen of the *Limnæa involuta*, in the summer of that year. I was there in wet weather, while Mr. Bendall was there at the close of the very dry summer of 1884, which circumstance will doubtless account for our different ideas as to the extent of the tarn. He gives it as twenty feet across; when I saw it I feel sure that twenty yards would be much nearer the mark. The hot weather may also have had much to do with his want of success, for it is very possible, as he suggests, that the mollusks might shelter in the mud. Another cause may have operated: when I was there my guide told me that I should have found 'a power more' had I been there a week earlier, but that a gentleman from London had a few days before swept the tarn with a fine net, and secured a great number." He adds:—"This shell, although first described by Mr. Thompson and very properly associated with his name, was discovered by my cousin, the late Dr. W. H. Harvey, for some time Professor of Botany in the Royal Dublin Society, and the author of a well-known work on British Seaweeds, 'Phycologia Britannica.'"

The Resting Position of Oysters.—In books on Conchology, such as Woodward's 'Manual of the Mollusca' and Jeffrey's 'British Conchology,' it is stated that the Oyster rests in the natural state on its left valve, which is the larger and more convex. In this respect it is pointed out that Oysters differ from the animals belonging to the genera *Pecten* and *Anomia*, which rest on the right valve, the *Anomias* being firmly attached by muscle with the flat right valve applied closely to the surface of attachment. In his lecture on Oysters at the Royal Institution, which was published in Nos. 1 and 2 of the 'English Illustrated Magazine,' Prof. Huxley also states that Oysters rest on the left or convex valve, the flat right valve acting as a kind of operculum. Examination of Oysters from the Firth of Forth has convinced me that this statement is erroneous. I do not know on what evidence the current belief of conchologists is founded. The evidence which appears to me conclusive is that the right flat valve is always quite

clean, while the convex valve is covered with worm-tubes, *Styela grossularia*, and Hydroids. The latter are in this connection the most important; it would be impossible for specimens of *Sertularia* and *Thuiaria*, four or five inches long, to grow, as I have found them on almost every Oyster, in the central-part of the left valve, if that valve were the lower in position. On examining *Pectens* I found that they resembled the Oyster in the contrast between the surfaces of the two valves, the upper convex one being covered with *Balanus* and other fixed animals, the lower being almost clean. It is generally stated that the *Pecten* lies on its right valve; if this statement rests on the evidence afforded by the condition of the surface of the valves, the same criterion applied to the Oyster leads to the same conclusion, that the right valve is the lower. I have never seen a young Oyster in the attached condition: Huxley states that it is the left valve which is fixed; in papers on the embryology of the Oyster I have not yet been able to find any definite information on the point. Whether it is the right or left valve that becomes attached when the larva assumes the sessile condition I cannot therefore say of my own knowledge, but with regard to the adult Oyster it seems to me certain that the current belief is caused by the repetition of an error. My attention was first called to this point by my assistant, Mr. John Walker, who tells me that the opinion of the fishermen at Newhaven is divided on the point, some saying that the convex valve, others that the flat valve, is the lower. — J. T. CUNNINGHAM (Scottish Marine Station, Granton), in 'Nature.'

SCIENTIFIC SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

January 20, Anniversary Meeting. — ROBERT M'LACHLAN, F.R.S., President, in the chair.

An abstract of the Treasurer's accounts was read by Mr. H. T. Stainton, one of the Auditors; and the Secretary read the report of the Council.

The following gentlemen were then elected as the Council for 1886:— President, Robert M'Lachlan, F.R.S.; Treasurer, Edward Saunders, F.L.S.; Secretaries, Herbert Goss, F.L.S., and W. W. Fowler, M.A., F.L.S.; Librarian, Ferdinand Grut, F.L.S.; other Members of Council, T. R. Billups, Edward A. Fitch, F.L.S., F. Du Cane Godman, M.A., F.R.S., W. F. Kirby, E. B. Poulton, M.A., F.G.S., H. T. Stainton, F.R.S., Samuel Stevens, F.L.S., and J. Jenner Weir, F.L.S., F.Z.S.

The President then delivered an address, and a vote of thanks to him was moved by Mr. Stainton, and seconded by Mr. Pascoe; and the President then replied. A vote of thanks to the Officers was then moved by Mr. Dunning, and seconded by Mr. Distant; and Messrs. Saunders, Fitch, Kirby, and Grut replied.—H. Goss, *Hon. Secretary*.





SPOONBILLS NESTING IN A HERONRY.



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ON THE FORMER NESTING OF THE SPOONBILL IN MIDDLESEX.

BY THE EDITOR.

UNTIL a very few years ago ornithologists were not aware of more than one record of the former nesting of the Spoonbill (*Platalea leucorodia*) in this country. This was the instance noticed by Sir Thomas Browne, who, writing in 1668 on 'Birds found in Norfolk,' mentions the *Platea* or *Shovelard* as having formerly built in the Hernery at Claxton and Reedham, and in his day at Trimley in Suffolk.*

In 'The Zoologist' for October, 1877 (pp. 425-429) I directed attention to the fact that a second and earlier record of the kind was to be found in a MS. Survey of certain manors in Sussex belonging to the Duke of Norfolk, taken "by commandment" of the Duke in 1570; the Spoonbills or *Shovelers* (as they are termed in this Survey) being described as breeding in that year with Herons in the woods called the Westwood and the Haselette at East Dean, near Goodwood.

I have now the pleasure of supplying some information respecting another breeding-place of the "Shoveler" hitherto overlooked by naturalists, this time in Middlesex, and so near to the metropolis as the Bishop of London's park at Fulham.

The evidence of this interesting fact is to be found in the Year Book of 14 Hen. VIII., fol. 1, wherein is contained a report

* Sir T. Browne's Works. Ed. Wilkin, vol. iv., pp. 313-324.

of an action for trespass brought by the Bishop of London in 1523 against a defendant to whom he had leased the park for grazing purposes, and who had taken some of the birds out of the trees, which by his lease the Bishop had expressly reserved.

The report, which is written in Norman French and printed in black letter, with numerous contractions, I have transcribed *literatim et verbatim*; but, as it is too long to be given here in its entirety, I will quote only so much of it as relates directly to the Herons and Shovelers, condensing the arguments put forward on behalf of the parties to the action:—

“*De Termino Michælis Anno xiv Regni Regis Henrici Octavi.*

“En trespas port p̃ l'Evesque de Lond̃ envs un N. p̃ son clos infreint & pur prisel de *Herons & Shovelers*. Le deff̃ dit q̃ le lieu ou &c contēn xx acres de terre que le dit Evesque lessa à luy p̃ tm̃ des ans & les *Herons* fesoient lour̃ nids deins &c & il eux prist. Et le pl̃. dit q̃ le lieu &c. est nom̃ un Park, que le pl̃. lessa al' def̃. except̃ le bois & subbois, & les *Herons & Shovelers* fesoient lour̃ nids in les dits arbres, & il eux prist; sur que &c.”

In plain English this would read:—

“Michaelmas Term in the 14th year of the reign of King Henry VIII.

“An action of trespass brought by the Bishop of London against one N. for having broken his close, and for taking *Herons* and *Shovelers*. The defendant says that the place where &c contains twenty acres of land; that the said Bishop leased it to him for a term of years, and the *Herons* made their nests therein &c and he took them. And the plaintiff says that the place &c is called a Park, that the plaintiff leased it to the defendant, excepting the wood and underwood, and the *Herons* and *Shovelers* made their nests in the said trees and he took them. Upon which &c [judgment is prayed.]”

Briefly stated, the chief argument for the defendant was that the plaintiff was entitled to no more than was implied by the words “wood and underwood,” that being all that he had reserved by his lease, and that the birds could not be included, as they were not expressly mentioned in the lease. On behalf of the Bishop it was contended that in as much as he had expressly

reserved the trees, he was entitled to all profits arising from those trees, "as for example acorns"; and consequently to the birds which habitually nested there.

Mr. Justice Brook thought:—"Il a[~]v intēst a eux p[~] rea[~]s del arb[~]r ou ils edifiēt, & auxy il a[~]v pp[~]té in ceux q[~]d ils sont ē s[~] arb[~]r; car il dira *nidum ardearum suarum cepit*, & doqe n'est lojal à aut d'eux p[~]nd. Come si jeo except un arb[~]r, & un esperv' fait s[~] nid in ē, ou bees sont in l'arb[~]r, ne list* a asc[~]† de eux p[~]nd; iffint‡ icy."

In other words:—"He has an interest in them by reason of the trees in which they build, and also he has a property in them when they are in his trees: for he will say the defendant took the nest of his Herons, and it is not lawful for others to take them. As, if I except a tree, and a sparrowhawk makes its nest in it, or bees are in the tree, it is not lawful for anyone to take them; so here."

A stronger case in support of this view was put thus:—

"Car si jeo lesse un manoir res'vant mon war[~]r, jeo aurai les conils":—

"For if I lease a manor reserving my warren, I shall have the rabbits"; liberty of egress and regress being implied. So in this case, the Bishop having reserved his trees, with implied access to them, was entitled to all profits arising from them, and could take the Herons and Shovelers, and the lessee could not legally touch them. Or, as the report runs, "l'Evesque peut ven[~] p[~] p[~]nd ceux, & le lessee ne puit loialent eux p[~]nd."

And so the Bishop obtained judgment in his favour, and the heronry with its Spoonbills, for the time being at all events, was preserved from destruction.

The story of this trial is full of interest, not only to naturalists, but to archæologists and to those learned in the law. One longs to know something more on the subject. Who was the Bishop? and who the defendant? Neither are named in the report of the case. § The name of the latter it is probably now impossible to

* ne list = non licet.

† asc = aucun.

‡ iffint = afin.

§ It is amusing to note the way in which English words are interspersed throughout these old reports, although confessedly written in the law French of the day. The Year Book, from which this Report is extracted, is entitled:—"Les REPORTS des CASES en les ans des Roys Edward V Richard III Henrie VII & Henrie VIII Tous qui par cy devant ont esté publiés. Or

discover, unless any of the pleadings in the action have by chance been preserved. The plaintiff may without doubt be identified as Dr. Cuthbert Tunstall, created Bishop of London in 1522, appointed Keeper of the Privy Seal in 1523, and translated to the see of Durham in 1530. Some account of him will be found in Faulkner's 'Historical and Topographical Account of Fulham,' 1813 (p. 199), Hutchinson's 'History of Durham' (vol. i. p. 440), and in Fox's 'Synopsis of the Newcastle Museum,' 1827 (p. 5), in a memoir of one of its founders, Marmaduke Tunstall, author of the 'Ornithologia Britannica,' and a descendant of the Bishop's brother, Sir Brian Tunstall, who was killed at Flodden in September, 1513. In the last-named work will be found a pedigree of the Tunstall family.

Dr. Tunstall, whose portrait hangs in the library at Fulham Palace, was evidently a naturalist who liked to see the birds building in his park, and no doubt was one of those who warmly supported the measure for the protection of wildfowl which became law only a few years later.

In 1534 an Act was passed by which "Shovelers," Herons, and other wildfowl were protected between the 1st March and the 30th June. This Act intituled, "an Acte to avoide destruction of Wilde-fowle" (25 Hen. VIII. cap xi) prohibited the taking of "any maner of egges of any kinde of wildfowle from or in any neste place or places where they shall chaunce to be laide by any kinde of the same wildfowle upon peine of imprisonment for one yere, and to lose and forfait for every egge of any *Crane* or *Bustarde* so taken or distroid xx pence, and for every egge of every *Bittour*, *Heronne*, or *Shovelarde* viijd, and for every egge of every *Malarde*, *Tele*, or other wildfowle one penie; the one moitie thereof to be to the King our soveraigne lorde, and the other halfe to him that will sue for the same in forme aforesaide." *

The heronry in the Bishop's park was in all probability a very ancient one at the date of the action, Fulham itself being a place of great antiquity. In the earliest document in which

nouvellement imprimé, corrigé, & revienué; ove plusieurs bonnes Notes en la Marge par tout le Livre, &c. Folio, London, MDCLXXIX." These Reports go back to the time of Edward I., and were printed from ancient MSS. in the possession of Sir J. Maynard, Knt., Serjeant-at-Law to Charles II. in 1678.

* Herons were protected by 19 Hen. VII. c. 11. See Nelson's 'Game Laws' (sixth edition, pp. 168. 169).

the place is mentioned, namely, a grant of the manor to the Bishop of London and his successors A.D. 691, it is spelled *Fulánham*.*

Norden, who himself lived at Fulham, tells us in his 'Speculum Britanniae,' 1593 (pars i. p. 20), that "the name of the place was anciently written *Fullenham* or *Fullonham*, which (as Master Camden taketh it)† signifieth *volucrum domus*, the habitacle of birdes, or the place of fowles, *Fullon* and *Fuglas* in the Saxon toong doe signifie fowles, and *ham* or *hame* as much as home in our toong. So that *Fullonham* or *Fuglas-hame* is as much to saie as the home, house, or habitacle of fowle. It may be also taken for *volucrum amnis*, or the river of fowle; for *ham* also in many places signifieth *amnis*, a river. But it is most probable it should be of lande fowle, which usually haunt groves, and clusters of trees, whereof in this place, it seemeth, hath been plentie."

This opinion of Norden (backed by the authority of Camden), although written some seventy years after the event in question, curiously enough receives strong confirmation from the fact that Herons and Shovelers, "lande fowle which usually haunt groves," were breeding on the very spot in 1523. Their existence there at this date is to be attributed partly to the direct protection afforded them by the lord of the manor, and partly to the inaccessible position of their nesting trees, which, so far as the general public were concerned, could only have been approached from the river, and then not without risk of action for trespass.

Local historians inform us that the few roads which then existed in the parish of Fulham were at times nearly impassable, two teams of horses being required to draw one cart. From entries in the parish books it appears that the highway rate at that period nearly equalled the poor rate, a proof of the wretched condition in which the roads must then have been. Indeed, it was not until about 1750 that there was much improvement in this respect.

* Wharton, Hist. de Episcop. Lond. 1676, p. 18. The manor of Fulham was anciently held by the Bishop of London of the Saxon Kings by the service of prayers for the soul of the donor, and in 1066, as appears by the Domesday Book, the Bishop of London held forty hides of land at *Fulcham*. The palace was built by Bishop Fitzjames in the reign of Henry VII., by whom he was created Bishop of London in 1505.

† Camden, 'Britannia,' 1586.

The amount of rent which the Bishop received under his lease in 1523 does not appear; but a few years later, namely, about 1547, two acres of meadow given by a benefactor to the poor of the parish of Fulham were valued at 13s. 4d. per acre.* The value of land here improved but slowly; a century or more later, namely, in 1665, an entry in the churchwardens' books shows that, at a vestry meeting held on May 15th in that year, it was ordered that all arable land be rated and assessed at 20s. per acre, and all pasture land at 30s. per acre.†

It would be interesting if the visitor to Fulham Palace at the present day could identify the trees (if still existing) in which the Spoonbills formerly had their nests. To point out the precise spot, however, would now perhaps be impossible, unless any tradition on the subject still survives, which is unlikely, or unless any old map or plan of the estate has been preserved on which the site of the heronry may be marked. The ground on which it stood is described in the report of the action above quoted as "a park containing twenty acres of land."

In Lyson's account of the parish (vol. ii., p. 353), we find the following description of the Bishop's palace:—"The house, gardens, and a large grass field called the warren, containing in the whole about 37 acres, are surrounded by a moat over which are two bridges. There belong also to the demesne about 17 acres of meadow by the water side, the western part of which [separated by a creek from Craven Cottage when Faulkner wrote in 1813] being a singularly beautiful spot was much improved by Bishop Porteus, who made secure embankments towards the river and ornamented it with a shrubbery and plantations."

I incline to think that this "17 acres of meadow by the water side" represents the "park of 20 acres" which was let for grazing in 1523, for it is not likely that any land within the still existing moat, and consequently so near the palace, would be let for such a purpose.

One thing seems certain, there were formerly many more trees around the palace than are now to be found there. When Queen Elizabeth visited Bishop Aylmer there previous to his death in 1594, she "misliked nothing but that her lodgings were

* Lyson's 'Environs of London,' vol. ii. p. 395 (1795).

† Faulkner, 'Hist. and Topog. Acct. Fulham,' p. 150 (1813).

kept from all good prospect by the thickness of the trees," as she told her vice-chamberlain, who reported it to the Bishop.*

As to the kind of trees in which the Herons and Spoonbills were building, it would seem, from a reference in the law report to "acorns" as profits arising from the trees reserved by the lease, that some of them at least were oaks. In 1793, amongst other fine old trees then standing, were several white oaks 8 ft. in girth and 70 ft. high, and some evergreen oaks 8 ft. in girth and 50 ft. high. But these may have been planted after Bishop Tunstall's time; perhaps by Bishop Grindall, who was a great botanist, and, according to Fuller, the first person who imported the tamarisk tree to this country about the year 1560.†

How long the Herons and Spoonbills continued to frequent the park at Fulham, and build in the trees there, we have at present no evidence to show. From the decisive steps taken by Bishop Tunstall to protect them, we may reasonably assume that they continued there at all events until his translation to the See of Durham in 1530. Whether his successor, Bishop Stokesley, took the same amount of interest in them, and continued to afford them protection, I have not discovered; a search amongst contemporary records having up to the present time failed to throw more light on the subject.

In the "Privy Purse Expenses" of Henry VIII. there is an entry relating to the Spoonbill in the year following Bishop Tunstall's departure, which reads as follows:—

"1531. Itm the x daye of Novembr paied to a svnt of my lorde Cobham's in rewarde for bringing of Shovelards to the King's Grace - - - - - iijs. viiijd."

But these birds probably came from Cobham Hall, near

* Strype's 'Life of Aylmer,' p. 103.

† A century later, in Bishop Compton's time (1673-1713), the gardens of Fulham Palace became quite celebrated by reason of the number of exotic shrubs and trees which that prelate imported and planted there. Ray has given some account of them in his 'History of Plants,' published in 1688, and frequent allusion is made to them in Aiton's 'Hortus Kewensis.' In the 'Philosophical Transactions' (vol. 47, p. 241), Sir William Watson has described the trees which he found growing there in June, 1751. The row of limes near the Porter's Lodge, of great age, were probably, says Lyson (vol. ii. p. 352), planted by Bishop Compton about the year of the Revolution, when the fashion of planting avenues of limes was introduced from Holland.

Gravesend, now the seat of the Earl of Darnley. A heronry has existed here from time immemorial, and it is quite possible that "Shovelards" may have once nested there with the Herons, just as they did at Fulham.

It seems unnecessary at the present time to show that by the name "Shoveler" or "Shovelard" the Spoonbill (*Platalea leucorodia*) was intended, and not the Shoveler Duck (*Anas clypeata*), especially as I have already dwelt upon this point in my former article on the subject (Zool. 1877, p. 428). In addition to the illustrations there given of the former use of the name "Shoveler" to designate the Spoonbill, the following may be noted:—

Drayton, describing the fenland of Lincolnshire in 1622, with its various wildfowl, mentions the "Shoveler" amongst the notable birds to be found in the Isle of Axholme, and refers particularly ('Polyolbion,' Song xxv.) to the whizzing sound of its pinions in flight, a peculiarity which no other writer that I am aware of has noticed.

Skelton, the poet-laureate, in his poem on 'Philip Sparrow,' notices "the Shovelar with his brode beek."

The accompanying plate is, by permission, from an illustration in 'Essays on Sport and Natural History,' published by Horace Cox, 'The Field' Office.

BIRD-LIFE ON THE SALTEES AND THE KERAGHS, CO. WEXFORD.

BY RICHARD J. USSHER.

THE Saltees are two islands lying off the south coast of Wexford, not far from the south-east angle of Ireland. The south Saltee is the larger, and is distant about three and a half miles from the mainland at its nearest point. It extends southwards about a mile and a quarter in length. No island equally large and elevated is to be found from Lambay Island north of Dublin Bay to Cape Clear, and most of the Wexford coasts are low and sandy; accordingly the South Saltee is the chief breeding resort of sea-fowl in this part of Ireland, continued persecution having driven them more and more from the coasts.

While yet miles from the island one is struck by the hosts of *Alcidæ* dispersed through the surrounding sea. Gannets on lengthy pinions are seen, but these are chiefly immature birds, and none certainly breed on the Saltees. The rapid buoyant flight of the Manx Shearwater may be compared with that of the Guillemot darting straight along; but, though numbers may be seen on the wing late in May, repeated search, continued after nightfall, has failed to discover the Shearwater or Petrel on land here.

As we approach the island its central portion looks low. This is cultivated by a farmer who lives there. Hills of granite rise towards either end, the whole southern end of the island being a rocky elevated tract of about fifty-six acres, rising to a hundred and ninety-eight feet above the sea, and girt with cliffs. This portion the sea fowl enjoy undisturbed.

We land beneath the farmstead on the north-west side. The western shore is sloping and shingly. Here a few Ringed Plovers breed, and Whimbrels loiter on migration. Round a small lagoon in the shingle one or two pairs of Oystercatchers breed, and in an adjoining bean-field beside the sea, I saw last May an Oystercatcher sitting on three eggs among the young bean-stalks. The nest was a depression lined with little pebbles, obviously placed there by the bird. From one of the rabbit-holes near the lagoon, or in the warren beyond it, a Sheldrake usually takes flight and alights on the sea to watch the visitor.

Crossing the island we find that the deep deposit of boulder clay which slopes so gently to the west is on the eastern side of great depth, and presents to the sea an indented margin of cliffs out of which innumerable masses of stone of all sizes project. Here we begin to realize the presence of those myriad birds with which the sea, the air, the cliffs, and the very earth beneath us is alive. Rows of Puffins stand blinking at us until we are within a few yards of them. Others startle us by issuing from holes beside us. The ground above all the cliffs (that margin the island except on the north-west) is usually honeycombed with the holes of this vast Puffin colony, which is considerably more than a mile in extent. In accessible places the Puffins lay far within their holes, but in the faces of the clay cliffs their eggs can frequently be seen from without. They lay on the Saltees early in May, but eggs have been taken there on the 22nd of June.

But the Puffins are only one element of that vast display of

bird-life. In every suitable nook of the clay cliffs or cranies of the rock-face Razorbills ensconce themselves, and lay towards the end of May, while the open rock ledges are crowded with Guillemots. In places any one with ordinary powers of locomotion can reach the breeding-shelves of the latter. Near the "Cat Cliff" lofty eminences rise from the sea, their faces all seamed with ledges, on every one of which Guillemots sit in rows. The small end of the egg is usually towards the sea, and the Guillemot sits with its breast towards the cliff. If the bird intends to depart, it is amusing to see how carefully it turns round and gets free from the egg, but, if suddenly frightened, it often precipitates its treasure in the panic of its flight. On the 14th of May, 1883, I could see no Guillemot's egg, and but one Razorbill's, on the island, though these birds were on their breeding-ledges. Guillemots lay here during the last week in May and the first half of June, Razorbills' eggs being somewhat more numerous in May. During a storm, the sea that breaks into the chasms and eaves of the cliffs is tremendous. It is then surprising to see how the Puffins and Guillemots will precipitate themselves into the boiling surf and flap along until they dive under the next wave, apparently swamped in the raging element. But they rapidly reappear far out, where the waves soon become dotted with them.

Rock Pigeons (with white upper tail-coverts) and Jackdaws frequent caverns in the boulder-clay and rocks, but Choughs are absent from the island, which is probably too much crowded with other species: they prefer to have a quiet sea-cave to themselves. A pair of Ravens are stated by a resident on the island to have bred there until a few years ago.

But, of the many breeding species, the Kittiwakes are the most attractive. Against the steep cliff-faces, whether of clay or rock, their innumerable nests are stuck like those of Swallows wherever a slight projection affords a basis. As we walk past and overlook cliff after cliff in the indented margin of the boulder-clay, we see an endless array of Kittiwakes seated on their nests while their mates are passing to and fro. They do not think of quitting their nests, though gazed at closely, and it is hard to scare them from their eggs until the intruder descends among them. When the male (?) returns from sea and alights on the nest beside his mate, both continue screaming for some

moments, with their pretty wings uplifted and heads crossed, first on one side and then on the other, until the new comer at length delivers up his prey to his mate. At the end of May, before an egg is laid in their colony, the Kittiwakes pass their day standing or working on the incompleated foundations of their nests; but on the 8th and 9th June, 1883, I took twenty clutches, in most of which incubation had commenced. This was the case with most of the Kittiwakes' eggs I took on the Bull Rock off Dursey Head, West Cork, on the 9th June, 1884, so that Kittiwakes appear to lay during the first and second weeks in June in the South of Ireland. I have never seen more than two eggs in a nest of this species, though three have been taken in a few cases on the Saltees.

While gazing into a bay margined with the singular cliffs of clay one may see a dark form in some recess far down, which proves to be a Shag or Green Cormorant, its sable plumage contrasting with the dove-like Kittiwakes. A more attentive scrutiny reveals several other Shags nesting in deeper cavities in the clay, some of them side by side. Further south, where the rocks rise beneath the cap of clay, we find several dens in the face of the latter looking out to sea, each tenanted by a hatching Shag or family of downy young ones, miniature Cormorants, which cry out in great excitement at our approach, but when first hatched the naked little lump of black flesh with its snaky neck and blind head tumbling about is hideous in the extreme.

On exploring the rocks which at one point are heaped on one another in tumbled masses, a Shag's nest may be found between two blocks open to the sky, or in a hollow beneath a huge mass of stone that rests on points of rock. The parent birds do not fly out to sea, but sit eyeing us from a rock a stone's-throw nearer the sea. I once approached a Shag that sat on a ledge outside the entrance of her den. She evidently thought to scare me away, for she continued to croak and snap her bill at me, writhing her snaky neck until I almost touched her with the pole I held. But Shags do not always breed in dens. At the south end of the island, where the cliffs are high and surmounted by very steep hill slopes, I descended to some secluded ledges, where I found several Shag's nests quite open to the sky. I have found young Shags on the Saltees on the 11th May, but

at that date most of the nests contained fresh eggs. Eggs may be taken all through May and into June, though at the same time large young ones may be found. This irregularity of breeding time in the Cormorants is a striking contrast to the Gulls' and Guillemots' habit of mainly laying within a week or two of the rest of their colony.

I have never seen more than three eggs or young ones in a Shag's nest on the Saltees, though I have taken four elsewhere.

The Common Cormorant can hardly find a part of the cliffs too much exposed to place its large nest. Of the three colonies of this species on the island, one range of nests is on the high cliff ledges at the extreme south end.

In May last, the Cormorants being driven off by our approach, we saw eggs in these nests. We then went away for a little while, and, on returning, found the eggs had all been taken, evidently by the larger gulls, who were breeding in hundreds close by; for my friend Mr. White saw a Herring Gull seize and carry off a Razorbill's egg, break it open, and eat it, and on going to the spot he picked up the shells of three eggs all broken or slit lengthwise.

But by far the largest colony of Common Cormorants is on the Makestone Rock, a huge isolated pyramid divided from the east side of the Saltee by a narrow strait. It rises some eighty or a hundred feet from the sea, and its top is black with crowded birds, among which the forms of Cormorants rise conspicuous.

I once swam the strait with a fishing-basket on my back and climbed the rock. The summit, of some extent, was covered with a living throng. On every prominence was a Cormorant's nest (no Shags breeding here), the hollow spaces between the nests being filled with Guillemots hatching, their snaky necks turning in every direction. The birds at first gazed at me, and were slow to take wing, but when they did so the storm and dust raised by their innumerable wings obliged me to crouch and close my eyes. I then found that there were young Cormorants of every size (it was the 9th June), from birds nearly full grown but still in down, to others just hatched. Round the edges of the platform the nests contained eggs in various stages of incubation, while the larger young ones towards the centre showed that the more favourable sites had been occupied first. There were deposits of guano between the knobs of rock of considerable age and

thickness, forming floors. On these lay innumerable eggs of Guillemots. Looking down the seaward side of the Makestone, the hosts of Guillemots exceeded anything of the sort I had seen. Wherever an egg could be stuck, a Guillemot had laid, often in very sloping places.

One evening I flushed a flock of Cormorants which were perched on a rocky hill opposite the Makestone. One remained asleep with its head under its wing until I caught it, when it inflicted a bite never to be forgotten, inserting its sharp hooked beak deep into my hand.

Forty Cormorants' eggs have been taken off the Makestone on the 15th June. I have taken them in the Co. Waterford from the 18th April onwards, but Cormorants chiefly lay about the beginning of May. Four is the usual number, though I have taken three and five eggs occasionally.

Throughout the elevated tract that forms the southern part of the island the surface is continually broken by groups and masses of rock, rising into craggy eminences towards the south end. As we approach this hilly region from the cultivated land, no golden furze meets the eye,—it is nearly absent from the island, but the landward hill-slopes are covered with wild hyacinths, presenting vast sheets of the loveliest blue. Here Lapwings breed, and their young ones have been seen on the 14th May. Among the beds of hyacinths loose rocks lie confused. From these we flushed a pair of Nightjars on the 14th May last, and found one of them about the spot for two days afterwards, not at all disposed to remain on the wing even at dusk. When one of these Nightjars was seen seated on a fragment of rock with nearly closed eyes, it was hard to convince ourselves that it was not a lump of moss. The boys of the island did not seem to know it. These birds were probably reposing after their migration on this sheltered side of the hill, the Saltees being within that portion of the Irish coast line where migratory birds are known to arrive in greater numbers than elsewhere. Nightjars breed commonly throughout the Co. Waterford in suitable localities, even near the sea.

On mounting the hill, the top is found to be a sheep walk covered with short grass and occasional sheets of bracken, while masses of granite project sometimes but little above the surface, forming in places groups of large stones, as though placed

there by the Cromlech builders. There we find ourselves invading the domain of Oystercatchers. The males, perched each on some little elevation, fly towards and over us with their shrill ventriloquial cry that seems to come from the ground beneath. The females slip quietly off their eggs, run a little way, and then join the males on the wing. We found three young in down on the 27th May, which ran a bit, separated, and crouched among the rocky ground where you would never discern them unless you had seen them squat. In this unusual breeding-place the Oystercatcher's eggs are often laid in a little hollow in the sod between some knobs of rock (which keep the feet of cattle off), and where some sheltering bracken is scattered. A few dead stems of the latter line the cavity, but in one instance this was lined with dry rabbit's dung, on which the eggs were laid. We found four nests besides the young on the hill-top last May, and three others on lower parts of the island. The eggs were two or three in number, in one instance a single egg, which, like the majority of the others, was much incubated. I only once saw a clutch of four taken on the Saltees. Oystercatchers seem to breed on all unfrequented parts of the island that are not too precipitous.

We now come to the great gullery which extends round the southern part and forms the most striking feature of this sea-bird's land. As you look down the hill-slopes towards the sea, you see them, especially in the rocky parts, spotted with Herring Gulls and Lesser Blackbacks, which, on observing your approach, first rise from their eggs, stand in front of their nests, and then take wing with loud outcries, forming a wheeling crowd overhead.

While walking over the uneven slopes, one's feet are constantly in danger of crushing some Gull's nest, which is often placed merely among the bosses of thrift, or in some little nook backed by points of rock, and is usually composed of tufts of withered thrift and other materials from the peaty soil.

The hundreds of these nests that one meets with round the hill-slopes, and even on the flat top, excite astonishment, and as we walk among them we are struck with the great difference made by security in the habits of these birds which lay thus on the open hills.

I know of no such colony of the larger Gulls in the South of Ireland, nor of any other breeding place of the Lesser Black-

backs along our coasts. In the Co. Waterford this species seldom occurs at the breeding time, except in the Waterford river, where numbers may be seen on the wing about thirty miles from the Saltees while their mates or relations are hatching there. The Herring Gull, however, breeds numerously along the Co. Waterford cliffs, and is the only species of Gull that does so. On the South Saltee the nests of both species are intermixed, but large colonies of each species may be seen separately in places; one little valley or hollow with its flanking ridges being tenanted by Lesser Blackbacks almost exclusively.

On the 14th May both species were laying or commencing to hatch. During my visit from the 26th to the 29th May last these Gulls were almost all hatching, and I saw but one clutch of young ones out, the season being a late one, while on the 21st and 22nd June, 1883, almost all the Gulls of these two species had young ones.

During a cold storm last May the Gulls were exceedingly slow to leave their eggs, and returned to them while I was still near.

On the same visit my friends Mr. Barrington and Mr. White found three nests of the Greater Black-backed Gulls; two of them, containing three eggs, each were near the summits of rocky brows at the south end of the island; and the third, which held but two eggs, was far out on a lower promontory near the great colony of Lesser Blackbacks, but apart from any nest of theirs. There were pellets of young rabbits' fur and bones near all the three nests, and the eggs they contained were about half incubated on the 26th and 27th May. The Greater Blackbacks were very wary, quitting their eggs as soon as they saw a human form moving.

It is stated in the fourth edition of Yarrell that I believe the Common Gull breeds on the Saltees. I am sorry to have to renounce this belief. On the 14th May, 1883, when we visited the Saltees, one of my companions gave me three Gulls' eggs, found "on the hill where the Gulls breed." They measure respectively 2.63×1.63 , 2.46×1.7 , 2.36×1.63 inches. I sent them to Mr. Howard Saunders, who kindly inspected them and wrote thus:—

"As certainly as any Gull's eggs can be named without proof,

the two sent are those of *L. canus*: quite the character. They might be small eggs of the Lesser Blackback."

I must adopt the latter suggestion, for, after four times visiting the Saltees in May and June, and receiving reports of other visits from observant friends, I have looked out for the *L. canus* or its eggs on such occasions, and enquired for it in vain. It seems only to visit this part of Ireland in autumn and winter, especially when stormy weather sets in.

But we now come to the noblest bird of the Saltees. At a point where the cliffs are highest and thickly tenanted with bird-life the Peregrine Falcon, sallies forth from her eyrie with rapidly repeated clamouring cry echoed from the rocky heights.

She takes her steady course through the air above us, her dark pointed wings quickly vibrating, and the black cheek patch giving her face a weird appearance. On scrutinising the cliff whence we started her, a little cavern may be seen in its earthy and stony face, immediately over which a Razorbill is hatching in its nook, while others sit around in close proximity. This little cavern contains three white things which, with a glass, are seen to be young Peregrines in down, who presently make themselves heard, on which their parent flies close above us with intense cries.

I describe the scene that was before me on the 26th May. We found feathers of Corn Crake and fur of rabbits at the Peregrine's plucking place over the eyrie, and on a former occasion the bleached leg of a hedgehog.

Young Peregrines are usually hatched in the Co. Waterford early in May, but on the 25th April last I found, in a long-frequented eyrie on the coast, two young newly hatched, an egg just chipping, and an addled egg. In the high mountains the eggs are not laid until the end of April.

I have not landed on the north Saltee Island. Its surface is chiefly pastured and tilled in places, and it contains no such cliffs as those of the South Island. Not being so suited for them, sea fowl do not appear to make it their breeding resort in any large numbers.

Birds observed on the South Saltee.—The species marked † are *believed* to breed on the island. Of those marked * the

eggs or young have been obtained there. *Peregrine Falcon, Spotted Flycatcher, *Hedge Sparrow, Stonechat, †Wheatear, *Wren, Pied Wagtail, †Rock Pipit, †Meadow Pipit, *Sky Lark, Common Bunting, Linnet, †Jackdaw, *Swallow, Swift, Nightjar, †Rock Dove, *Oystercatcher, *Ringed Plover, *Green Plover, Whimbrel, Corn Crake, †Sheldrake, *Cormorant, *Shag, *Guillemot, *Razorbill, *Puffin, *Kittiwake, *Lesser Black-backed Gull, *Herring Gull, *Great Black-backed Gull.

The Keragh or Keroe Islands.—Two small uninhabited islands in Barmow Bay, about one mile from the mainland of the Co. Wexford and seven miles from the Saltees. Owing to submerged reefs landing is dangerous. Within their rocky margin their surface is covered with luxuriant grass and herbage. As one nears the western Keragh in June a clamorous colony of Terns may be seen about its highest part, which all take wing when one lands, and remains at such a height that one cannot settle the question whether they are of the Common or Arctic species. My own impression, when I visited the Keraghs on the 7th June, 1883, as well as that of others on a different occasion, was that both species were seen. I found many of their eggs, sometimes on the bare rock or shingle, and sometimes among the grass where it was not growing rank. There I saw numbers of depressions as if Terns were preparing to lay. In most cases I found single eggs, but in many there were two, and in only one case three eggs. They were all fresh. Twenty-five of them vary in length from 1·67 to 1·48 inch, and in breadth from 1·23 to 1·09 inch, the average measurements being 1·6 × 1·15 inch. While some, from their larger size and pale colour, may be eggs of the Common Tern, many others being smaller, dark, and boldly marked, must belong to the Arctic Tern. Mr. Sturge found but one Tern's egg on the Keragh on the 30th May, 1883, but on the 21st June Messrs. Baker, Salter, and Neale took many, of which the greater part were slightly incubated. This fixes the second week in June as the time the Keragh Terns laid most eggs. Mr. Baker remarked, "As far as I observed, no clutch on the shingle contained more than two eggs, while on the grass I got several clutches of four besides the usual three." Probably the nests containing four eggs were used by two females. A few Terns lay on the shingly beach

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on the north side of the eastern Keragh, but, owing to the rabbits which abound through its grassy portion, it is otherwise forsaken by Terns in favour of the western island, where there are no rabbits. The River Suir below Waterford seems to be a favourite feeding resort of the Keragh Terns. We saw large numbers of them on the wing there in the end of May. No Sandwich Terns appear to breed on any island I have visited, but I saw a Lesser Tern on the 9th June on the lonely head of Ballyteigue Bay, where, along the miles of shingle, this species may find suitable breeding-places. On the 7th June, 1883, I saw a flock of seven Turnstones on the Keraghs, and on the 20th August following I saw several on the coast of Waterford. I have no reason, however, to suppose that this species breeds with us. Rock Pipits, Oystercatchers, and Ringed Plovers breed on the Keraghs, and a Corn Crake's nest has been found there. Sheldrakes have been repeatedly seen flying out of the rabbit warren on the eastern island, where they probably breed and a large flock of Wild Duck (*A. boschas*) took wing from the sheltered side of the east island on our approach. Both these species of Duck are reported to breed among the intermediate sand-hills and lagoons of the south coast of Wexford.

NOTES ON THE SEAL AND WHALE FISHERY, 1885.

BY THOMAS SOUTHWELL, F.Z.S.

THE general depression which seems to have settled so heavily upon all branches of industry has certainly made no exception in favour of the Seal and Whale Fishery, for, although in some cases the catches have been slightly in excess of those of the season of 1884, the price of produce has so seriously declined that the results will be very unprofitable to those who have embarked their capital in the costly vessels and outfits necessary for this speculative trade.

The Newfoundland Sealing, owing to the prevalence of easterly gales blocking the ice and preventing the vessels from getting amongst the Seals, has been very unequal. Twenty-one British vessels left St. John's Harbour, some of which were jammed in the heavy ice, and two were frozen up all the spring; those,

however, which did succeed in getting amongst the Seals made very large catches, the 'Resolute' of Dundee heading the list with 39,482, followed by the 'Ranger,' 36,925, the 'Falcon,' 25,312, the 'Iceland,' 24,500, the 'Terra Nova,' 21,741, the 'Aurora,' 12,345, and three others, each with above 10,000 seals, but the remainder did very badly; two were clean, and the remaining ten averaged only 1746 Seals each. The total catch of the nineteen successful vessels was 211,587 (against 192,175 last season), 71,272 of which fell to the share of the eight Dundee vessels which formed part of the fleet, only three of which, however, had paying cargoes, the remaining five taking 973 seals between them. If I am correctly informed that the expenses of one of the large Newfoundland steam sealers, which are from 300 to 500 tons register, amount to about £7,000, not more than five or six of the St. John's fleet would make any return, notwithstanding the increased capture of Seals.

The passage out to the Greenland Sealing was one uninterrupted succession of gales, for the most part from the westward (*cf. antea*, p. 51, 52), and it was not until the 7th of April that the 'Eclipse' succeeded in reaching the sealing ground, and then too late to secure a share of the 'Whitecoats.' About twenty vessels were present, and some 30,000 Seals killed, about 20 per cent. of which were probably old ones; the Scotch vessels secured 13,300, and the Norwegians about 29,900. Last season the young Sealing was estimated to have yielded 75,000, it is evident, therefore, that the pack must either have been much less numerous than on that occasion, or that a larger number of the young brood escaped. The latter supposition is rendered probable from the unusual number of young Seals met with in the subsequent old Seal-shooting, which proved virtually a blank, the Hooded Seal-shooting later on not being much better.

It is probable that one or more of the larger vessels next season will not incur the additional expense of leaving port so early as heretofore, but will confine themselves, at least for a season, entirely to the Whale fishery. The total catch of Greenland Seals, old and young, for the eighteen Scotch vessels was 26,448, giving an average of only 1469 each; the 'Hope' headed the list with 6567, followed by the 'Earl of Mar and Kellie,' 4100; 'Erick,' 2885; and 'Polar Star,' 1395. The remaining vessels

had under 1000 each, and the 'Intrepid,' with 4500 Seals, was wrecked, her crew being brought home by two Norwegian vessels. To this number must be added the produce of 5852 seals, the bulk of which was brought home from a station in Cumberland Gulf by the 'Germania,' raising the total northern fishery to 32,302.

The value of the 103,574 skins brought home this season from Newfoundland and Greenland at 6s. per skin would represent a sum of £31,072, to which must be added the probable produce of 1317 tons of oil at £20 per ton, or £26,340, making a total of £57,412, against a similar estimate in 1884 of £50,553. The 1885 total is helped up by the very heavy catches of some of the Newfoundland vessels, but the money estimate, owing to the depressed state of trade and the uncertain value of produce, is approximate only.

Captain Gray is still of opinion that the season opens too early, and is endeavouring to obtain an extension of the close time until the 10th of April; opinion amongst the sealers seems not to be unanimous with regard to the desirability of such an extension, but there can be no doubt the Greenland sealing is rapidly becoming unremunerative, whilst the produce is all but unsaleable; added to which the seasons of late have seemed to fight against the sealers; so that even the splendidly constructed vessels which leave the ports of Dundee and Peterhead can barely live through the weather they have experienced. It seems evident that, at least in the case of the Greenland Seals, the time is rapidly approaching when it will not pay to incur the serious outlay and risk necessary in pursuing them, and to this cause it will probably be due if the Seals escape total destruction. It is by no means certain, however, that even the withdrawal of the Scotch vessels would have any beneficial effect, for the field would then be left clear to the Norwegians, with whom the Scotch cannot compete in consequence of the less expensive manner in which the former are enabled to work their vessels; they would then probably congregate in greater numbers than at present, and, as smaller cargoes would pay, then the work of extermination would still be continued. Looking at the matter from all points of view it seems to the writer that an extension of the close time, say to the 10th of April, even if attended with a present loss, is the only way of rescuing this

important industry from extinction. The Seals would be larger, and, perhaps, not in such fine condition as on the 5th, but the advantage would make itself apparent in the increased numbers which would in a few years be found on the ice at the breeding-season. Surely, seeing the hopeless condition to which the sealing is being reduced, the experiment is at least worth trying, if only for a few seasons.

Turning to the Right Whale fishery, the deficiency is even still more conspicuous, as compared with the season of 1884. The Davis Straits vessels return 27 Right Whales (to which must be added the oil and bone of two whales brought home by the 'Germania' from a Cumberland Gulf station), against 79, and the Greenland ships 12 as against 11 fish in the previous year; the whole resulting in 510 tons of oil and 418 cwt. of bone compared with 912 tons of the former and 932 cwt. of the latter in 1884. And this falling off in produce is also attended by a serious reduction in price, whale-oil being difficult to dispose of at £20 per ton, and whalebone, which in 1884 sold for £2250 per ton, having this season been sold for £1100! The probable value of the produce would thus be £31,800 against £88,570 in the season of 1884.

The Bottle-nose fishery, too, in consequence of the number of small Norwegian vessels which have been attracted by the profits of past seasons, has fallen off from 317 fish and 312 tons of oil to 84 fish and 51 tons of oil this year, and even this reduced quantity, owing to the forced sales of the small owners engaged in the fishery, is probably not worth more than £28 per ton, whereas three years ago it readily sold for £60. Large stocks of this oil are also, I believe, held by the more wealthy owners.

Amongst the small game brought home by the Davis Straits vessels were about 200 White Whales, 220 Narwhals, and the usual number of White Bears; also about 190 Walrus, which were killed by the Davis Straits vessels. The Greenland vessels rarely meet with the Walrus, as it is pretty well exterminated at Spitzbergen by the Norwegians; an occasional solitary individual, however, which has become carnivorous and wandered far from his native shore in search of Seals, is sometimes met with far out at sea (*antea*, p. 54). At Franz Josef Land, according to Mr. Leigh Smith, they are very numerous, and I am also informed that in Frobisher's Straits they are still plentiful;

moreover, on both shores of Davis Straits, owing to the whalers being in too great a hurry to reach the north water to stop to hunt them systematically, they are still abundant.

I am informed that the Behrings Straits fishery has yielded about 200 Whales against 190 in the previous season.

My notes this year are, I fear, very commercial in their tendency, but some of the incidents of the voyage of the 'Eclipse' which Mr. Robert Gray has been good enough to allow me to extract from his private log, will be found printed in this Journal for February last (pp. 50--54). As on former occasions, I have again to express my indebtedness to Capt. David Gray for information with regard to the Greenland fishery; to Mr. D. D. Adamson, of Greenock, for particulars of the Newfoundland Sealing; and to Mr. David Bruce, of Dundee, for general statistics of the season's voyage.

NOTES AND QUERIES.

The Philosophy of Natural History.—Lord Rosebery has endowed a new Lectureship in the University of Edinburgh. The course, which will extend over five years, will consist of thirty lectures on the Philosophy of Natural History. The lectureship has been offered to, and accepted by, Mr. G. J. Romanes, F.R.S. This is the second lectureship which has recently been founded in connection with the Chair of Natural History. The other one is on Comparative Embryology, and is occupied by Mr. G. Brook, F.L.S. *Apropos* of this subject, we have often wondered why Dr. Fleming's 'Philosophy of Zoology' (2 vols. 8vo, Edinburgh, 1822) is not more read and better known than it appears to be. It is an admirable work for the date at which it was written, and on many points may be still consulted with advantage. The same author's 'History of British Animals,' published in 1828, seems to be much better known.

The Zoology of Central Asia.—In 'The Zoologist' for June, 1885 (p. 227), we published some information respecting the travels of Colonel Prjevalsky, and his investigation of the Fauna of Central Asia. The last number of the Journal of the Russian Geographical Society (xxi. 3) contains a letter from him, dated Lob-nor, 29th January, 1885. From this it appears that after having spent a month at Tsaidam, the expedition, on the 18th September, resumed its further advance, following the hills of the Kuen-lun, that is, of the border range of the plateau of Thibet. Southern

Tsaidam is an immense flat land, formerly the bottom of a lake, covered with brushwood at the foot of the mountains, and with salt clay elsewhere. A narrow salt lake, Dobasun-nor, extending west to east, receives the rivers Bayan-gol, Naidmin-gol, and Umu-muren. Pheasants are numerous in the brush and the small marshes covered with rush. Other birds, even migratory, are scarce, as also mammals, which avoid a ground impregnated with salt. Only Bears coming from Thibet are numerous when the fruits of the *khormyk*-brush are ripe. Further north and north-west, as far as the Altyn-tagh Mountains, extends an immense dry desert, the soil of which consists of clay, sand, and gravel. Several of its parts man never visits, and only wild Camels wander on its barren surface. Col. Prjevalsky met with only two places having plenty of fresh water and grazing grounds,—at Hansy and at Has, where a lake of the same name has a circumference of nearly thirty miles. Leaving at Has some provisions under the guard of seven Cossacks, the remainder of the party went west to explore the valley nearly 150 miles long between the Altyn-tagh, in the north, and the Kuen-lun, in the south: the valley slowly rises from 9000 ft. at Has to 14,000 ft. at the junction of both chains of mountains. An easy passage across the Altyn-tagh leads them to Cherchen, and must have been utilised formerly on the route from Khotan to China, while another route led, *viâ* Lob-nor, to the Sa-cheu oasis. The excursions of the party around Has took fifty-four days, during which a region absolutely unknown before was explored. It has a very poor flora and fauna; of mammals only a hundred Antelopes were shot, and a new species of *Ovis* has been discovered. Col. Prjevalsky gave it the name of *Ovis dalailamæ*. The climate of the region is very severe. In December the temperature was seen to fall during the night below 40° Cels. Day and night strong westerly winds were blowing, often taking the force of a gale, which filled the atmosphere with sand and dust. Returning in January to the station of Has, Col. Prjevalsky resumed his journey to Lob-nor, 170 miles distant, where he was well received by his former acquaintances. There he proposed to stay throughout February to study the migrations of birds.

MAMMALIA.

Wolves in France.—Notwithstanding the active pursuit and the high premiums paid, the efforts to extirpate Wolves in France have not yet been successful. Wolves are still numerous in the forests with dense undergrowth, especially those of the Ardennes and Vosges. The latest statistics published by the French Ministry of Agriculture prove this. According to this source there were paid, in 1883, in premiums 103,720 fr. for the slaying of 1308 Wolves (9 full-grown male and 32 female, 774 half-grown, and 493 young Wolves). The premium paid for a full-grown Wolf is 200 fr.; for a she Wolf, 150 fr.; for an animal not yet fully grown, 100 fr.;

for a young Wolf, 40 fr. Only thirty-one departments are enumerated in which no Wolf was killed, whilst the number in the remaining departments varies between 1 and 131. Wolves were killed in the following departments:—Dordogne, 131; Meuse, 122; Haute-Vienne, 107; Haute-Marne, 89; Meurthe-et-Moselle, 81; Vosges, 71; Charente, 66; Corrèze, 58; Haute-Saône, 55; Côte-d'Or, 54; between 10 and 50 in the departments of Aube, Creuse, Vienne, Morbihan, Indre, Finistère, Charente-Inférieure, Cher, Côtes-du-Nord, Ardennes, Cantal, Marne, Mayenne, Puy-de-Dôme, Saône-et-Loire, Sèvres (Deux), and Var, whilst in twenty-eight departments the number of wolves killed during the year was below 10.

Wild Animals in Algeria.—In the eleven years from 1873 to 1884 the number of Lions killed in Algeria was 202, for which a premium of £400 has been paid by the Government. The number of Panthers destroyed in the same period was 1214, and the money paid by the Government £720. About £400 has been paid for 1882 Hyænas, and £1600 for 27,000 Jackals. The large *Felidæ* are almost extirpated, principally in the western provinces, and the Lion of the Desert is fast becoming a myth.

White Chamois, White Otter, and White Fox in Germany.—We learn from 'Nature' that in Germany an unusual number of white varieties of animals have been noticed this winter. "A white Chamois was shot in the Totengebirge, a white Otter was caught near Luxemburg, white Partridges were shot near Brunswick, and a white Fox was killed in Hessen." It is to be regretted that no further details have been forwarded, since, with the exception of the Partridge, white varieties of these animals are by no means common. Von Tschudi, in his important work on the Alps, mentions a white Chamois which was killed in 1853, in the Grissons, between Bonaduz and Versam, and particulars of three others will be found in 'The Zoologist,' 1878, p. 337. There is a white Otter in the Belfast Museum, which was shot at Islay in April, 1850; while, in the present number, Mr. Cecil Smith reports the recent capture of a white Fox in Somersetshire.

A White Fox in Somersetshire.—A white Fox seems to be a sufficiently rare occurrence in this county to be worth a note in 'The Zoologist.' On Tuesday, February 2nd, the Taunton Vale Hounds met at Cothelestone, and in the course of the day we found and ran a white Fox. He was, as may be supposed, a most conspicuous object before the hounds, especially at one time, when they were running on the opposite side of one of the Quantock combs to which most of the field were, and we could see him going along about two fields ahead of the hounds, when another Fox would hardly have been noticed. Eventually he was run to earth, dug out, and killed. The next day I had an opportunity of examining him. He was a dog Fox, about ordinary size, nearly all white, the only fox-colour being the back part of the ears, a patch on the top of the back just behind the

shoulders, and a long streak on the upper part of the brush. The eyes were the normal colour, so he could hardly be called an albino, nor could he have changed to winter pelage, as Stoats frequently do, for we had heard of him from the keeper at Cothelston, who had seen him from time to time all the season, even before the cub hunting commenced in August, though none of us had met with him.—CECIL SMITH (Bishops Lydeard).

Pine Marten in Scotland.—At a recent meeting of the Clydesdale Naturalists' Society, Mr. James Lumsden exhibited a specimen of the Pine Marten, *Martes abietum*, which was killed by the head forester, Mr. James M'Donald, in the Black Mount Forest on the 30th November last. This animal is said to be now of rare occurrence in Scotland.

Risso's Grampus in the English Channel.—I have to record the occurrence of another and a rare cetacean in the Channel, Risso's Grampus, *Grampus griseus*, which was captured in a herring-net, on February 3rd, about eight miles south of the Eddystone Lighthouse. It proved to be a female, and a beautiful specimen, showing, on its dark grey skin, the eccentric marble-like markings which are peculiar to the species. Its head was much rounded, and, as I thought, had a great resemblance to that of a Seal. Extreme length of body nine feet; greatest girth five feet two inches; dorsal fin high, and flippers rather long and pointed. Three teeth only in front on either side of the lower jaw, and none on the upper jaw. The fishermen said that when first caught, and also when dying, it made a noise like groaning. This is the second example that has been taken off Plymouth; the first, procured in 1870, is now in the British Museum. The skeleton of the recent specimen is being prepared for the Plymouth Institution, and its skin has been presented to the Albert Memorial Museum, Exeter.—JOHN GATCOMBE (Durnford Street, Stonehouse).

Dead Whales in the English Channel.—During the month of November last, two large Rorquals, *Balaenoptera musculus*, male and female, each over sixty feet in length, were found floating dead in the Channel within three weeks of each other, one off the Start and another near the Eddystone. The first was taken into Brixham, where it remained several days, and was afterwards purchased and towed by steamer into Plymouth; but the second, a magnificent animal, was brought by two trawlers into Plymouth directly after it was found, and was (with the exception of its belly being greatly inflated with air or gas) in a most perfect state of preservation both in colour and form. I am sorry to add that, although these were the only large whales which had been brought into the port for more than fifty years, they excited but little interest. Only twelve months since I travelled from Plymouth to a place called Littleton Pill, fifteen miles beyond Bristol, for the express purpose of seeing a large Rorqual

which had been stranded on the banks of the Severn, and most gratified was I with the sight. I fear the purchasers of the two Plymouth whales must have experienced great pecuniary loss.—JOHN GATCOMBE (Durnford Street, Stonehouse, Plymouth).

BIRDS.

Observations on the Migration of Birds.—We have received the following appeal from Mr. Cordeaux on behalf of a Committee appointed by the British Association, and heartily commend it to the notice of our readers. Mr. Cordeaux says:—"You are doubtless aware that in 1880 a Committee was appointed by the British Association, for the purpose of collecting observations on the Migration of Birds at Lighthouses and Lightships, and that this Committee has since been annually re-appointed by the same Association, which in 1882 granted £15, in 1883 and 1884 £20, and in 1885 £30, in aid of the expenses incidental to the enquiry. Six reports have already been issued by the Committee, and a seventh is now in course of preparation. About 200 stations on the coasts of Great Britain and Ireland and the outlying islands, as well as several foreign stations, are annually supplied with letters of instruction and printed schedules for registering the occurrence of birds. The work of distributing these circulars, the constant correspondence with the observers, the tabulation and recording of each separate entry, and subsequent writing of the report, entail a great amount of labour, and from the increasing interest taken in the enquiry, as indicated by the number of well-filled schedules sent in, there is every prospect of the work being much heavier in the future. It is highly desirable that the observers should be supplied with some means of forwarding the wings and feet of any birds killed against the lanterns of the lighthouses and lightships, as well as small specimens entire. Unless this is systematically done, no really accurate results of the species on migration can be arrived at. Unfortunately, the funds at the disposal of the Committee are totally inadequate to meet the annually increasing and heavy demands made upon it, and in the last year the expenditure amounted to £74 13s. 10d.; the receipts, including the grant made by the British Association, to £36 10s., leaving a balance of £38 3s. 10d. to be made good by the members of the Committee. On these grounds, therefore, Donations or Annual Subscriptions are earnestly invited from those taking an interest in the subject.—JOHN CORDEAUX (Secretary to the Committee, Great Cotes, Ulceby, Lincolnshire)."

The Destruction of Rare Birds.—The Editor's remarks (p. 74) induce me to say a word or two upon the destruction of rare British birds. In every volume of 'The Zoologist,' and of other natural-history journals, numerous instances are recorded of the destruction of European and other birds which periodically visit this country. Several of these, as the Golden

Oriole, Hoopoe, Bec-eater, &c., are common in many parts of the Continent, and therefore specimens, if desired, are readily procurable. Almost every year these and other birds visit the British Islands, and in some instances doubtless would stay and breed if they were only protected. Instead of this, as soon as one is noticed it is immediately shot at, and either killed or frightened away. Many persons styling themselves "naturalists," I fear, are to a great extent answerable for this, by offering high prices for British-killed specimens, even sometimes shooting them themselves during the close time, in defiance of the law. Would it not be more becoming on the part of British ornithologists to discourage the killing of these feathered visitors, and to encourage them to stay and breed in these islands, procuring their "specimens," if wanted, from abroad?—S. L. MOSLEY (Science Department, South Kensington Museum).

Movements of Grouse in Hard Weather.—For some weeks in January this neighbourhood was covered to a considerable depth with snow, which, owing to sudden changes from thaw to frost with frequent fresh falls of snow, became a very solid mass. There was considerably more than a foot in depth above the heather on the moors, and large drifts formed on a very extensive scale. The Grouse suffered severely, being quite unable to penetrate the frozen mass for food, and in consequence they left the moors for the lower cultivated land to an extent never previously observed. The nearest point of moor to Masham is three miles distant, but the open moors are considerably further away. Walking near this ground great packs of Grouse would sweep overhead, and pass right down the valley over the town. A field of turnips was swarming with the starving birds, which vainly attempted, with numerous Partridges, to scratch down for food. The Grouse were perched on the fences, feeding on the berries like so many Fieldfares, and on several occasions they alighted amongst the branches of trees. They were feeding in the hedgerows about Burton House, and close to the outskirts of the town, and even on the heaps of manure close to buildings where persons were working all day. As far as one could see they had abandoned the moors, and were feeding miles away in the cultivated districts on anything they could get in the way of food. A large farmer whose land lies three miles still further away from their usual haunts states that immense flocks of Grouse were feeding in his turnip fields. Gangs of men were being employed to clear away the snow from patches of heather, but their efforts did very little towards providing feeding-ground for the vast numbers of starving birds.—THOMAS CARTER (Burton House, Masham).

[We learn from another source that about the time above mentioned there was an extraordinary exodus of Grouse from the moors in the neighbourhood of Ilkley, in consequence of the very inclement weather. The birds in many places left the moorland altogether, and large packs were seen in the fields about Arthington and Weeton, and even as low as

Harewood Park. A considerable number of Grouse were picked up by the men working on the North-Eastern Railway at the viaduct at Arthington, having been injured by contact with the telegraph-wires. The birds seemed quite bewildered, and it was thought vast numbers would never find their way back to the moors. Hares and Rabbits also, it was said, were dying in great numbers, and Partridges in some places were being fed with corn, in order to keep them alive while the country was covered with deep snow. During a severe winter some years ago we remember to have heard that in Caithness the Grouse were all down *on the sea-shore*, and hardly a bird was to be found on the moors.—ED.]

Effects of Heavy Snow upon Grouse.—The late severe storm has worked sad havoc amongst the Grouse on the Weardale Moors. Large numbers of birds were driven down into the lowlands in search of food, and many were observed in the immediate vicinity of this town and the surrounding villages. On Feb. 7th a friend, who had been in the country some eight or nine miles to the westward, said he had seen hundreds of Grouse in the fields by the roadside all the way as he drove home in a blinding snowstorm. It is to be feared that the majority of these will never find their way back to the moors; for, being thoroughly starved and bewildered, they would fall an easy prey to their enemies, both biped and quadruped. On the Consett branch of the North Eastern Railway a great many birds have been killed by flying against the telegraph-wires, and not even within the memory of the proverbial “oldest inhabitant” in the Wear Valley has there been such an influx of Grouse into the low-lying country. The following extract from the ‘Newcastle Chronicle’ will give some idea of the ravages of the storm in the adjoining valley of the Tees:—“The continued hard weather in Teesdale has demonstrated the fact that foxes are numerous beyond expectation. Within the limits of the Earl of Zetland’s hunt great havoc has been made amongst poultry, and an evening or two ago no fewer than five turkeys were destroyed on the farm of Mr. James Byers, of East Shaws, near Barnard Castle. In open day foxes approach the farm-houses, commit depredations, and even retaliate upon intruders. In Lower Teesdale no fewer than sixteen hares were seen upon a patch of growing turnips cleared of snow by the wind, and the timid Cusbat has made its way into the streets. Grouse have been starved off the moors, and many landowners who are game-preservers have shot hares rather than allow them to become poor in condition.” A correspondent, some three or four miles west of this, writes:—“On Sunday, Feb. 7th, there were hundreds of Grouse in the fields here, and some of the hedges were swarming with them, feeding on the hawthorn buds.”—T. H. NELSON (Bishop Auckland).

Buzzard and Bittern near Oxford.—A few days ago I saw a Common Buzzard, which had been killed in a trap on Feb. 5th at Horton, about six

miles from Oxford. It was a male bird, one of the dark type, and rather a large one, measuring 21 in. On Feb. 8th a Bittern (*Botaurus stellaris*) made its appearance at Merton, near Bicester, and of course was shot. It also proved to be a male, in good condition. Both are now being preserved by Mr. Darbey, 5, Market Street, who informs me it is a long time since he has had either species brought to him for preservation.—ARTHUR H. MACPHERSON (Trinity College, Oxford).

Ivory Gull and Little Auk in Caithness.—A mature specimen of the Ivory Gull was shot at Bishop's Castle, Thurso, on the 30th December last, by Mr. J. G. Millais, then on a visit to this county (Caithness). This gull is but a rare visitor to Britain, although I know of several specimens having been got in Orkney and Shetland. The first authenticated instance of the occurrence of the Ivory Gull in this county is recorded (Mem. Wern. Nat. Hist. Soc., vol. iv. p. 501) by Mr. Lawrence Edmondston, whose talented communications to various learned societies and scientific journals have rendered invaluable service in the way of illustrating the Ornithology of his native county. Mr. Edmondston's specimen was a bird of the second year, and was shot in Balta Sound in December, 1822. The late Mr. Strang, of Sanday, a gentleman who did for Orkney much the same as Mr. Edmondston did for Shetland, shot a specimen of the Ivory Gull in the Bay of Firth, Orkney, in 1832, and another shot in Orkney, November 27th, the same year, was exhibited at a meeting of the Zoological Society of London. I examined another shot at Kirkwall by the late Mr. Rankin, of that place, in 1849. Early in January I saw a fine lively specimen of the Little Auk, which had taken shelter inland a few hundred yards from our stormy bay during an easterly gale. This species is much more numerous in the Orkney Islands after a westerly gale than they appear to be here, and in the former county they can always find shelter in some of its numerous bays or on the lee side of an island, which they cannot do here.—W. READ (Wick).

[Of late years the Ivory Gull has been more often observed. Twenty-two instances of its occurrence are particularized in our 'Handbook of British Birds,' pp. 174, 175, of which four relate to Orkney, Shetland, and Caithness.—ED.]

Hybrid Finches.—As hybrids between Bullfinch and Goldfinch are probably of somewhat rare occurrence, it may be well to place on record the fact that two such hybrids, both cocks, bred from Goldfinch cock and Bullfinch hen, were in the possession of Mr. John Beach, of Little Horton Lane, Bradford, in 1858, and were exhibited by him at a Bird Show at the Crystal Palace in November of that year. Both birds were stated to be then four months old. A hybrid between Goldfinch and Greenfinch, aged about two years and six months, was exhibited by Mr. Hugh Hanley, of the

Life Guards; and, at the same show, Mr. E. T. Keys, of Beresford Street, Woolwich, exhibited a bird which he described as a cock hybrid between Skylark and Sparrow, but which was nothing more nor less than a Common Bunting (*Emberiza miliaria*), as I learnt from Mr. A. D. Bartlett, who saw all the above-mentioned specimens.—J. E. HARTING.

New Colonies of the Black-headed Gull in Norfolk.—When visiting Somerton Broad, in 1884, I saw a number of Black-headed Gulls in very immature plumage (some of them, indeed, only just able to fly), and was informed that a few pairs had established a new colony on the edge of this piece of water. It was then too late in the season to look for nests, but last summer another visit was paid in May, with the result that we found a colony firmly established. Twenty-one nests contained eggs, and about forty more were ready for eggs. The establishment of any new colony of this marsh-loving Gull is, I think, a matter of more than local interest. In 1883 Mr. F. Norgate found a colony at Langmere, near Thetford, consisting of forty or fifty nests. I saw no signs of them in the preceding year (1882), when at the same lake, and Mr. Norgate is informed they did not nest there in 1884, so very likely they only nested there one year, and have now gone back to the parent gullery at Scoulton, distant, as the crow flies, nine miles, where I learn from Mr. E. Newton, who has been there lately, that the Gulls are doing well. Mr. T. Southwell tells me that the Hoveton Broad colony has moved to Little Hoveton Broad, a distance of a mile and a half,—it is to be hoped not a premonitory symptom of their breaking up altogether in a locality where they have now been established thirty years. The small colony which existed at Barton Broad a few years ago (see ‘Catalogue of the Birds of Norfolk,’ p. 36), is extinct, and seems never to have consisted of more than a nest or two. The movements of Gull colonies are rather erratic: for a list of those existing up to 1884, see J. E. Harting, ‘The Field,’ Feb. 2nd and 16th, 1884, and H. Saunders, Yarrell’s ‘British Birds,’ 4th ed., pt. xxii. These writers justly consider that there are few marsh species which have suffered less than the Black-headed Gull.—J. H. GURNEY, jun. (Northrepps, Norwich).

Changes of Plumage in the Kestrel.—When does the male Kestrel assume its perfect adult plumage? I do not say “breeding plumage,” because probably it breeds before assuming the perfect adult plumage. From the series I have before me, it seems to me to take longer than has generally been allowed. Mr. Dresser says:—“The first signs of adolescence appear on the upper tail-coverts, which become bluish grey; and afterwards the tail gets gradually grey, the black bars by degrees disappearing, while the blue head is the last to be donned. We have seen a specimen shot in December which had the blue tail of the male, but preserved the rufous head of the female, while examples killed as late as May have slight

remains of black bars on the tail and a dash of rufous on the head." The question, of course, arises, are these last-mentioned examples in their first or second, or even in their third, May? From the series I have before me I am inclined to think they are at least in their second, and possibly in their third, May, and that the full adult plumage is not attained till after the autumn moult following. Professor Newton, in the 4th edition of Yarrell's 'British Birds,' says:—"Young males are like the female till after their first winter, but then begin to exhibit adult plumage, the head being the last part to change." In former editions of this work it is stated that "Young males are like the females till after their first winter, but begin by slow degrees of change in colour to exhibit the plumage which distinguishes the males after having completed their first year." Thus Yarrell would give the male Kestrel a year before beginning to exhibit the change of plumage. But he does not (neither do the others) tell us how long it takes to complete the adult plumage. No. 1, the youngest example in my series, was killed in January. There is no indication of blue on the head; there is, however, a very slight wash of blue just perceptible in some lights on the tail; and on the tail-coverts blue is the predominating colour, though the feathers are distinctly barred with dark brown. The feathers on the back and rest of the upper parts have broad patches of dark brown towards the tip, and also dark brown bars nearer the body. No. 2, a male killed in May, has a very slight indication of blue on the head; the dark streaks on the feathers of the head are, however, narrower than in No. 1. The feathers on the rump and tail-coverts are uniformly blue, having no dark markings except the narrow shaft-streak. The tail-feathers are very distinctly barred, but a decided wash of blue appears, especially near the base of the feathers. The feathers on the back and rest of the upper parts are more like those of the adult male, having only a small spot of dark brown towards the tip, but still the spots are larger and more frequent than in older birds; the wing-coverts, however, are barred also. No. 3 was killed in August, probably his second August. This bird has decided indications of blue on the back of the head; the new feathers on the rump and the tail-coverts are also blue. The feathers of the tail are barred, but not so broadly and distinctly as in Nos. 1 and 2, the bars towards the body becoming very indistinct, and there is a decided wash of blue especially towards the base of the feathers. On the upper parts the new feathers have only the dark spot towards the tip, some of the old feathers, however, showing the dark bars of the female. This bird had not completed its moult. No. 4, killed in March, has a nearly perfect blue head, with only slight indications of rufous appearing; rump blue; tail-coverts, though mostly blue, have still rather faint dark bars apparent. The tail-feathers are narrowly but distinctly barred and washed with blue towards the base; the outer web of the two outer tail-feathers are pale blue nearly throughout

their length ; the dark bars, however, are apparent. The feathers on the back and the rest of the upper parts have very slight black spots towards the tips, and no bars except on the wing-coverts. No. 5, from Guernsey (unfortunately not dated), is in nearly perfect adult plumage, a very slight tinge of rufous on the head, the only other indication of its not being fully adult being traces of dark bars on the inner webs of the tail-feathers, except the two central ones ; these are, however, very distinct, though not reaching across the web. Although not dated, this bird was probably shot in December or January, for Mrs. Petherick, the local taxidermist, had one brought into her shop during the last week of December in nearly identical plumage. No. 6, killed in January, is in nearly perfect adult plumage, a very slight tinge of rufous on the head, very slight spots—they can scarcely be called bars—of black on the inner webs of the outer tail-feathers, only near the foot of the feather. This bird may, of course, be of the same year as No. 5, the dark bars gradually disappearing as the breeding-season draws on. On the upper parts the dark marks are entirely confined to the triangular spots near the tips of the feathers ; there are no dark bars even on the wing-coverts. My other skins are No. 7, an undoubted adult female from Guernsey, not dated. No. 8, a female, killed in December, shows some traces of blue on the rump and tail-coverts ; with this exception the appearance of the upper parts is decidedly that of the female, the dark markings being much broader and more regular than in the youngest male of the series. The last of my series of skins, No. 9, killed in Guernsey, but not dated, seems rather an exceptional bird, almost amounting to a variety ; it is pale all over, and particularly pale and mealy on the rump and tail-coverts ; the tail-feathers also are pale, though slightly tinged with blue towards the body ; the dark bars on the two central tail-feathers are little more than spots, not reaching either to the shaft or to the outside edge of the feather. I should call this a young male in its first January, though for some reason the blue has not been developed on the rump and tail-coverts, which are of a pale whity-brown. Taking this series throughout (the dates where given I know to be correct), it would seem that No. 1, killed in January, was in its first January, and had completed its first moult, there being no old or worn feathers about it. No. 2, killed in May, would be in its first May, that is to say nearly, if not quite, a year old. No. 3, killed in August, would be in its second August, and consequently rather more than a year old. No. 4, killed in March, would be in its second March, and therefore within two months a year older than No. 2. There is a gap between Nos. 4 and 5, especially as to the tail, but No. 5, having gone through the autumn moult, might account for this, otherwise there would be another year to account for ; anyhow, it could not be younger than its third August. No. 6 would be a month older again. It seems to me that all these gradual changes in plumage cannot be accounted

for in one or even two years, and that, giving credit for considerable advance towards maturity by change of colour between the moults, the male Kestrel would be more than three years old before attaining its fully adult plumage. This, I think, is a considerably longer period than has generally been supposed, and, as my series is not complete, the gap between Nos. 4 and 5 may represent another year.—CECIL SMITH (Bishops Lydeard, Taunton).

The Australian Lyre-bird.—Having been stationed at intervals for some years on the mountains of Eastern Manaro, in the southern part of New South Wales, the habitat of the Lyre-bird or Native Pheasant (*Menura superba* or *paradisea*), I have thought some fuller particulars regarding its habits than are usually obtainable might be interesting to your readers. This range of mountains, the more sheltered sides of which form the home of those interesting birds, attains a height of over 4000 feet above sea-level. The sides, sloping towards the coast at a general angle of about 45° , are heavily timbered with eucalypti, wattle, and musk trees, and covered with a dense undergrowth of ferns and creepers, the gullies being filled with tree-ferns. Generally speaking, there is a noticeable absence of game, but at certain seasons the forest resounds with the varied cries of the male Lyre-bird. The hen builds her nest at the foot of a trunk of a tree, of twigs and bark, lining it with dried ferns and grass, and leaving an opening in the front of the top. Herein she deposits the *one* egg on which she sits (for, as an Irish friend said, “she only lays one egg at a time”), leaving the nest daily for food. The country here abounds in the hills of ants, from those of the large bull-dog ant, an inch long, to those of a small black variety, and it is upon these insects and their larvæ that the Lyre-bird chiefly subsists. The bird is of a sooty black colour, with a body somewhat larger than that of a pigeon, but has a tail of graceful form and beautifully marked. Ordinarily, this tail is simply carried behind like a peacock’s in repose, but if found upon their “dancing beds,” with head erect and tail expanded over the back, they are decidedly handsome. These “dancing beds” are patches of comparatively clear ground, from one to two yards in diameter, with the ferns trodden smoothly upon the surface, upon which the birds assemble, and dance and strut to their apparent great delight. The original cry or call of the Lyre-bird is a very simple one, but his adopted one partakes of that of every sound he hears; for he is a most wonderful mocker, not only of other birds, such as the parrot, cockatoo, yang-yang, or magpie, but he will imitate to the life the bullock-driver with his whip, the step of the teamster’s horses, the rasping of the cross-cut saw, and the blows of the axe and tomahawk; and, more wonderful still, more than one of these at the same time, so that the solitary explorer is led to believe he has suddenly come upon pioneers of civilisation in the heart of the forest. The male bird is exceedingly pugnacious, and this fact is made use of by the settlers to his destruction, for his tail is worth three dollars.

By imitating one of his prominent calls the hunter can lure him within gun-shot, although naturally very shy; he comes to repel a fancied intruder into his domain. His flesh is very dark-coloured and coarse, and only used as food in cases of necessity. Many attempts have been made to rear the birds in captivity, and there is a report that *one* has been successful. With this exception, which I cannot authenticate, I never heard of any result but failure. The sound of his call so alters in proportion as his tail is in full feather or indifferently ornamented, that hunters can judge from that whether or no any individual bird is worth pursuit. My apology for asking for so much of your valuable space must be in the fact that, until I set myself the task of getting the above information I could not obtain it from published accounts. — ALFRED MORRIS (Railway Survey Camp, Manaro, New South Wales), in 'Nature.'

FISHES.

Porbeagle Shark at Plymouth.—On the 26th January last I examined a fine male Porbeagle Shark, *Squalus cornubicus*, eight feet in length, which had been taken in a herring-net off Plymouth. Its eyes were large, and almost round, the irides dark, with a small oblong spot of emerald, or bright pea-green, in the centre of the pupils. This species is far less frequently captured by the Plymouth fishermen than the Blue Shark, *Squalus glaucus*, which has been rather plentiful on the coasts of Devon and Cornwall during the last few years.—J. GATCOMBE (Durnford Street, Stonehouse).

MOLLUSCA.

The resting position of Oysters.—I observe in the last number of 'The Zoologist' (p. 79) that Mr. J. T. Cunningham has revived the question as to the natural position of the Oyster in its bed. He is right in his opinion that these bivalves *usually* lie with the left, or convex, valve *uppermost*. Prof. Huxley and other authorities are also correct in the statement that the shell is *invariably attached* by the convex valve. The discrepancy is explained by the fact that most Oysters in their first or second year become detached from the substance to which they fastened themselves in their infancy. This is effected either by the "cultick-knife" of the dredger, who makes it his business to separate the young brood from the stone or shell to which it is found adhering; or, more frequently, by natural means, as, the "spat" being generally deposited in clusters, the individual Oysters grow against each other, and the shells are thus forced upwards from the surface of attachment and ultimately broken off. To facilitate this operation the tiles used in artificial breeding-grounds for the collection of the spat are coated with a friable cement. If the free Oyster falls on the convex shell it soon becomes turned over by the motion of the water, and then remains

lying on its flat valve, in which position (often with the umbo buried in the soft soil) it is comparatively free from disturbance by the action of the restless sea. Another advantage resulting from this position may be that particles of sand or mud which would be retained in the concavity of the rounded shell, to the injury of the delicate mantle and branchiæ, are readily swept away from the flat surface of the right valve. Larval Oysters often become attached singly to fragments of shell or very small stones. When these Oysters have grown somewhat larger than the substance to which they are fastened they are practically free, and become turned over as soon as the left valve has assumed sufficient convexity. When an Oyster is attached to a stone sufficiently heavy to moor it in its bed in its normal position, and is thus allowed to grow to maturity, the flat upper valve will be found covered with the rich growth of zoophytes, sponges, and algæ which Mr. Cunningham rightly says are ordinarily found only on the convex valves of Oysters brought up by the dredge. I have an illustration of this in a beautiful specimen now in my aquarium.—SIBERT SAUNDERS (Whitstable).

SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

January 25, 1886.—WILLIAM CARRUTHERS, F.R.S., Vice-President, in the chair.

Dr. T. Spencer Cobbold read a paper “On *Strongylus Axei* and its affinities. This diminutive maw-worm, obtained from the stomach of a donkey, possesses interest, inasmuch as its structural characters closely correspond with those of the Entozoon (*Strongylus Douglasii*, Cobb.), infesting the proventriculus of the ostrich. It also shows affinity with the grouse strongyle (*S. pergracilis*), and with the stomach-worm (*S. contortus*) of lambs; while its peculiarities throw light upon other questions of morphology, especially its relations to the singular maw-worm (*Simondsia paradoxa*, Cobb.) of the hog.

February 4, 1886.—Sir JOHN LUBBOCK, Bart., F.R.S., M.P., President, in the chair.

Mr. James Dallas exhibited a specimen of the Glossy Ibis, *Ibis falcinellus*, Linn., which was purchased last spring from Mr. James H. Clyde of Bradworthy Vicarage, near Holsworthy, Devon, in whose possession, or that of his family, it had been from the time it was killed in the neighbourhood. It is mentioned by Morris, in his ‘British Birds’ (vol. iv. p. 172), as follows:—“In the ‘Western Times’ of October 11th, 1851, it was

recorded that a specimen of this rare visitor was shot at Holsworthy, in North Devon, on the 7th September." This specimen is now in the Albert Memorial Museum, Exeter. Another in the same collection, in which the beak is more curved, is said to have been shot at South Molton in October, 1851, and was presented to the Museum by Mr. William Tombs.

Mr. Clarence Bartlett exhibited a remarkable specimen of caterpillar, about seven inches long, of a steel-grey colour, hairy and spiny, which he believed to have been brought from Africa. [Figured in 'The Field,' Feb. 20.]

Mr. A. Hammond drew attention to a microscopic section of the integument of the larva of a dipterous insect, *Stratiomys chamaleon*, raising the question as to whether the polyzonal areas described by M. Viallanes on the external surface of the cuticle were cellular in their nature, as Mr. Hammond suggested, or mere surface markings.

A paper was read by Mr. E. C. Bousfield, "On the annelids *Slavina* and *Ophidonais*. In this communication he comments on Vejdovsky's new genus *Slavina*, and objects to his identification of *Nais appendiculata* with *Nais lurida*, giving a full description of the latter, and observing the points of contrast. He also describes touch-organs in *Ophidonais* as similar to those in *Slavina*, and mentions other points of similarity between the two, proposing to abolish the latter genus, placing its only species in *Slavina*. A diagnosis of this species is given with appropriate illustrations.

Prof. R. J. Anderson read a paper on the relative lengths of the segments of limbs in the Chick during development, from a series of measurements made between the sixth and twentieth days. On, or even before, the ninth day the bones of the forearm and manus are longer than the corresponding bones of the lower leg and foot. Afterwards the tarso-metatarsus begins to lengthen and attains a greater relative size at the end of incubation.

February 18, 1886.—Prof. ST. GEORGE MIVART, F.R.S., in the chair.

Prof. H. Macaulay Posnett, of Auckland, New Zealand, was elected a Fellow of the Society.

Mr. A. D. Michael read a paper "On two new *Acari* of the genus *Glyciphagus* discovered in Moles' Nests, viz. *G. platygaster* and *G. dispar*." These curious creatures are characterised by a large flat abdomen, bordered by singular rough projections and large spines. The most remarkable point concerning them is that in one species, *G. platygaster*, the male, although somewhat different from the female, is not more so than is usual in the genus, and would be known directly as the male of the same species; while in the other species, *G. dispar*, the female of which closely resembles that of *G. platygaster*, the male is totally unlike both its own female and the male of *G. platygaster*. The size, form, and arrangement of the legs are

quite dissimilar, and the projections and spines absent. *G. dispar* is also interesting as affording proof of the retro-anal position of the bursa copulatrix, and of its being the posterior median projection characteristic of the female of the genus. The bursa communicates by a long, fine sperm-duct with a large receptaculum seminalis, and this again by two short, wide ducts with the ovaries and long contorted oviducts. The articulation of the hind tarsi in the male of *G. platygaster* is modified to give greater play to the joint for clasping purposes. Mr. Michael speculates upon the cause of the similarity of the sexes in the one species, and their great dissimilarity in the other, both being found together, and apparently under the same conditions. The following specimens were shown under the microscope in illustration of the communication, viz. *G. platygaster*, male and female, and *G. dispar*, male and female, *in coitu*.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

January 19, 1885.—Prof. W. H. FLOWER, LL.D., V.-P.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of December, and called attention to a male Cheetah, *Cynælurus jubatus*, presented to the Society by Nawab Mirza Hassim Ali Khan, of the Afghan Frontier Survey; to a female Tiger and four Persian Gazelles, deposited by Dr. J. E. T. Aitchison, Naturalist to the Afghan Boundary Commission; and to two curious hybrid Ducks, *Tadorna rutila*, and the Egyptian Goose, *Chenalopex ægyptiaca*, presented by Sir Joseph Fayrer.

A letter was read from Dr. C. S. Minot, of 25, Mount Vernon Street, Boston, Mass., U.S.A., calling attention to the Elizabeth-Thompson Science Fund for the advancement and prosecution of scientific research, and inviting applications for assistance from it.

A communication was read from the Rev. T. R. R. Stebbing, containing descriptions of some new Amphipodous Crustacea from Singapore and New Zealand.

Mr. Howard Saunders exhibited an adult specimen of the Sooty Tern, *Sterna fuliginosa*, caught alive near Bath, October, 1885, and pointed out that only two examples of this species had as yet occurred in Great Britain.

Mr. H. J. Elwes read a paper on the Butterflies of the genus *Parnassius*, having special relation to the development, functions, and structure of the horny pouch found in the females of this genus. He described the habits, distribution, and variations of twenty-three species which he recognised in the genus; and illustrated his remarks by the exhibition of a very complete collection of specimens of drawings. The paper was supplemented by Prof. Howes's remarks on his examination of the anatomy of the *Parnassius*

apollo, and by Mr. Thomson's notes on the habits of the insects as bred in the Society's Gardens in 1885.

Mr. Oldfield Thomas read a paper containing a list of the specimens of Mammals collected in various parts of India, and presented to the British Museum by Mr. A. O. Hume. The series consisted of 400 specimens, nearly all in excellent condition, and with accurate localities attached to them. A new Mouse from Tenasserim was proposed to be called *Mus Humii*. A new Flying Squirrel from the Malay Peninsula was named *Sciuropterus Davisoni*.

A communication was read from the Rev. Canon Tristram, containing the description of an apparently new species of Duck (*Dafila*) from Sydney Island of the Phoenix group in the Central Pacific, which he proposed to name, from its extreme simplicity of plumage, *Dafila modesta*.

A communication was read from Mr. A. G. Butler, containing a description of the larva, pupa, and imago of a Butterfly, *Aporia hippia*, from specimens bred in the Society's Gardens.

February 2, 1886.—Prof. W. H. FLOWER, LL.D., V.-P.R.S., President, in the chair.

Mr. W. B. Tegetmeier exhibited and made remarks on a Pheasant from the Persian borders of Transcaucasia.

Mr. C. A. Wright exhibited a Dove of the genus *Turtur* from Malta, and identified it as a semi-albino variety of *Turtus auritus*.

Mr. Sclater exhibited, on behalf of Mr. W. H. Dobie, a young specimen of Sabine's Gull, *Xema Sabinii*, which had been obtained at Mostyn, on the coast of Flintshire.

Mr. Seebohm exhibited a specimen of Ross's Gull, *Larus Rossi*, obtained in June last in the neighbourhood of Christianhaab, Disco Bay, Greenland.

Capt. R. G. Wardlaw Ramsay exhibited and remarked on a specimen of a new bird of the genus *Copsychus* obtained by Mr. H. Pryer in North-Eastern Borneo, which he proposed to call *C. niger*.

A communication was read from Prof. R. Collett, containing an account of the external characters of the Northern Fin-Whale, *Balænoptera borealis*, based upon the examination of numerous specimens of this whale killed on the coast of Norway during the past summer.

A communication was read from Dr. G. Stewardson Brady, containing descriptions of some new fresh-water Entomostracous Crustacea from South Australia.

Dr. H. Woodward communicated, on behalf of Dr. Monticelli, a catalogue of the species of Bats found in South Italy.

Mr. R. B. Sharpe read the first of a series of notes on birds in the Hume Collection. The present communication treated of the specimens supposed to belong to the Hawfinch of Europe, which had been collected at Attock,

and showed that they belong to a different species, which Mr. Sharpe proposed to call *Coccothraustes Humii*.

Mr. F. E. Beddard read the third of his series of notes on the Isopoda collected during the voyage of H.M.S. 'Challenger.' The present paper completed the preliminary description of the new species of this group collected during the voyage, which amounted altogether to about forty-five in number.

Mr. J. H. Leech exhibited and described specimens of a Butterfly from Mogador, which he referred to a variety of *Anthocharis eupheno*.

February 16, 1886.—Dr. ST. GEORGE MIVART, F.R.S., Vice-President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of January, and called attention to a many-marked Snake, *Rhagerrhis multimaculata*, presented by the Rev. G. H. R. Fisk, and received January 1st, 1886; also to the birth of eight Tree Snakes, in the Society's Reptile House, on the 9th January. The mother, a fine example of *Dryophis prasina*, presented by Dr. F. H. Bauer, of Buitenzorg, Java, was received on the 15th August last, so that she must have been for upwards of five months without any possibility of intercourse with a male of the same species.

Mr. Sclater exhibited a specimen of the new Paradise Bird, *Paradisornis Rudolphi*, of Finsch and Meyer, lately discovered by Mr. Hunstein in the Owen Stanley Mountains of New Guinea, and pointed out the characters in which it differs from typical *Paradisaea*.

The Secretary exhibited, on behalf of Mr. L. Taczanowski, the skin of an Owl from the south-east of the Ussuri country, on the frontiers of Corea, which appeared to be referable to *Bubo Blakistoni* of Seeböhm.

Mr. E. Gerrard, jun., exhibited heads and skulls of two African Rhinoceroses, *R. bicornis* and *R. sinus*, obtained by Mr. Selous in Mashuna-land.

Prof. Ray Lancaster exhibited and made remarks on a drawing of a restoration of *Archæopteryx*.

Mr. Oldfield Thomas gave an account of a striking instance of cranial variation due to age, as shown in two specimens of the skull of the Canadian Marten, *Mustela Pennanti*, which presented extreme differences in the breadth of the zygomata, in the contraction of the interorbital space, and in the development of the occipital crest. Special stress was laid on the fact that such changes as these take place after the animal has attained maturity.

Mr. W. L. Sclater exhibited and described a new Madreporian Coral, which he proposed to call *Stephanotrochus Mosleyanus*. The coral had been dredged in the Faroe Channel during the cruise of H.M.S. 'Triton' in the summer of 1882. Some account of its anatomy and histology was also given.—P. P. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

February 3.—ROBERT M'LACHLAN, F.R.S., President, in the chair.

The President nominated Mr. F. Du Cane Godman, F.R.S., Mr. H. T. Stainton, F.R.S., and Mr. J. Jenner Weir, F.L.S., Vice-Presidents for the ensuing year.

Dr. Livett, Lieut. Goodrich, Messrs. Eustace Bankes, and F. Enock, were elected Fellows; and M. Ragonot, of Paris, ex-President of the Entomological Society of France, was elected a Foreign Member of the Society.

Mr. C. O. Waterhouse exhibited some scales of *Coccidæ* (*Eriopeltis*), some of which were found by Mr. F. Moore on blades of grass at Ilfracombe; and others were found by Mr. Waterhouse on blades of grass in the Warren at Folkestone. Mr. E. A. Fitch remarked that *Eriopeltis festuæ* had been recorded as British at a meeting of the Society held about thirty years ago.

Mr. Douglas sent for exhibition leaves of *Euonymus japonicus*, received from M. Lichtenstein, infested by *Chionaspis euonymi*, which occurred in great numbers at Montpellier and Nismes, and always destroyed the shrubs attacked by it.

The President exhibited specimens of *Tettix australis* (Walker), received from Mr. Oliff, of the Sydney Museum, who had captured them at the River Nepean, New South Wales. Mr. Oliff stated that the insect was decidedly subaquatic; he had found the insects not only on the surface of pools of water, but also eight or ten inches below the surface on the stems of water plants.

Mr. W. F. Kirby exhibited, on behalf of Mr. Ralfe, several specimens of *Lycana corydon* of a very extraordinary character; and Mr. Weir and others made remarks on them.

The Rev. W. W. Fowler exhibited a specimen of the almost unique beetle, *Harpalus calceatus*, taken by himself at Bridlington, Yorkshire; also a specimen of *Apion Lemoroi* (Brisout), a new French *Apion* taken on the coasts of Normandy and Brittany. He also exhibited several species of British *Helophori*, and read notes on their synonymy.

Mr. H. Goss read an analysis of M. Brongniart's recent work on 'Les Insectes Fossiles des Terrains Primaires' (Rouen, 1885), and expounded that author's views on the classification of insects from geological data.

The Rev. W. W. Fowler read notes on "A small collection of *Languriidæ*, with descriptions of two new species."

Dr. Baly communicated a paper entitled, "Descriptions of new genera and species of *Galerucidæ*."

Mr. J. Edwards communicated the first part of a synopsis of British *Homoptera-Cicadina*.—H. Goss.



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THE FINWHALE FISHERY OF 1885 ON THE NORTH EUROPEAN COAST.

BY ALFRED HENEGGE COCKS, M.A., F.Z.S.

THE season of 1885 was a very remarkable one. On the one hand, Rudolphi's Rorqual, which was previously only known to the eastward of the North Cape as an accidental straggler, appeared last year in thousands along the whole coast whose waters are hunted by the Norwegian and Russian Finwhalers, over 700 of this species having been captured; on the other hand, Sibbald's Rorqual, or the Blue Whale, hitherto the principal object of pursuit, was extremely scarce, several of the Norwegian companies not having taken a single example, the average being less than one per boat; while the Russian boats averaged exactly half a dozen each, the number of this species killed by the three Russian companies actually exceeding that taken by the nineteen Norwegian establishments.

The total capture of *Balenopteridæ* off the north coast of Europe last season reached the enormous number of about 1400 Whales. The amount of oil procured, however, was not much more (and proportionately considerably less) than that from the total of something under 500 Whales killed in 1884, since one Blue Whale gives as much as ten or a dozen Rudolphis'.

The following is probably a fair estimate of the relative values of the different species of Finwhale hunted; reckoned in petroleum casks, which hold from 40 to 44 gallons each, the nett

weight of this quantity being about 170 kilogrammes, = about 3 cwt. 40 lbs. :—

A Blue Whale gives an average of about 70 casks of oil (not often less than 60, and occasionally up to 100).

A Common Rorqual gives an average of about 25 casks (seldom less than 20, and reaching up to 35).

A Humpback gives an average of about 15 casks (seldom up to 20, and rarely even 30).

A Rudolphi's Rorqual gives an average of about 5 casks,* and occasionally up to 7.

Captain H. Ellefsen classes the oil somewhat differently to the classification given me by Captain Andreeff last year (Zool. 1885, p. 140), viz. :—

Class 1.—From the blubber of the back. That from the Common Rorqual is clearer than that from the Blue Whale, but they are mixed indiscriminately and considered as the same class. The oil from Humpback and Rudolphi's Rorqual are slightly inferior to the other two species.

Class 2.—From the blubber of the under side and tongue.

Class 3.—From the intestines and second boiling of the blubber.

Class 4.—From the bones and meat.

The colour of the oil depends on the amount of boiling; first class oil can be made as dark as fourth class by more boiling. The relative amounts of each class of oil can be approximately seen by the results obtained by Capt. Sörensen from 76 Whales in petroleum casks :—1st quality (upper side), 653; 2nd quality (under side), 209; 3rd quality (2nd boiling), 80; 4th quality (krang). Most of these were boiled down at the Guano Factory, where, from 200 krangs, 900 casks 4th class oil were obtained (in addition to the guano).

* Since the above was written I have looked over the MS. of a paper by my friend Professor Robert Collett, of Christiania, about to be published in the Trans. Zool. Soc. "On the external characters of *Balanoptera borealis*," in which he puts the average amount of oil obtained from individuals of that species at 15 barrels. This, perhaps, includes all the oil, while the above figures only include the oil extracted from the blubber, without reckoning the inferior quality from the *krang*, i. e., the flesh, bones, &c. Also, Professor Collett's barrels may, perhaps, mean the Norwegian *Tünde*, a measure equal to about 30 gallons, instead of the American petroleum cask holding from 40 to 44 gallons.

Three-fourths of this number (*viz.*, 76, not 200) consisting of small Whales, and the remaining quarter including no Blue Whales, the amount is naturally smaller than the average from that number of mixed *Balenopteridæ*; but the proportion of each quality also would not always hold good, as the relative amount of each quality differs in the different species, and young Whales have more blubber than old ones; the time of year also makes some difference.

The system of converting the krang into guano is becoming more general, and a large quantity is now manufactured. The following figures will give some idea of how extensive this branch is:—The Haabet Company and the Christiania Whaling Company have each about 6000 sacks of guano; “Jar Fjord Cattle-tonic and Glue Company” (Kraftfoder* og Lim Fabrik) has from 5000 to 6000 sacks; and Ara 1700 sacks: total about 19,000 sacks, holding 100 kilos. (4 bushels).

With regard to the value of the oil, I cannot do better than quote from a letter received in November from Capt. David Gray, of Peterhead, and which he has kindly given me leave to make public. He says:—“Our home markets have been overstocked with it so much that we cannot now sell a single ton of oil at a price that would pay the bare expense of taking it. Norwegian Finner-oil is now selling in London at £13 per ton. Our own Whale-oil is now only £22, instead of £40 as it used to be. It is also much the same with the Seal-oil. In 1882 I opened up a new fishery, *viz.*, the Bottle-nose. I could readily get from £50 to £60 per ton for the oil. The Norwegians got notice of it through our newspapers, sent out a number of ships,—in fact elbowed us out of it: they are now selling this oil in London at £25 per ton. It cost me £32 per ton to deliver it in London, so you can easily see that soon stopped us catching the Bottle-noses. I thought at first that I had ‘struck oil,’ having killed in two months 203 of them, yielding 232 tons, which I sold in London for £12,700. We could live and thrive at those prices, but I would not send a boat after them now.”

Capt. Gray goes on to give a gloomy view of the Greenland Whaling, which, though foreign to the subject of this paper, is

* Kraftfoder (lit. “strength-provender”), is intended as a tonic for cattle, and not merely as manure (Zool. 1885, p. 137).

of so much interest that I may hope to be excused for quoting it : —“ There is a great outcry at present about the failure of the Dundee ships this season. They have themselves entirely to blame. They steam about so much on the whaling banks that they have scared all the Whales through to Behring's Straits, and only left a few suckers on our side, who are not old enough to take care of themselves. We are also suffering from the stupid way in which the Whales were killed say fifty years since, and Davis Straits has been undergoing a process of extermination for the past two hundred years. There will soon be a close time for Whales. Dundee is going to work out of it. They are not going to renew any of their ships : they are losing some of them every year. Here (Peterhead) we have only three first-class ships in the trade instead of twenty-eight, which we had twenty-five years ago. Besides all this, the oil is not wanted, even at the present low prices. We have great doubt here whether we will send our ships out again in the spring, having over a thousand tons of oil lying unsold, and cannot get a market for it.”

Very few Whales were to be seen on my passage north in August. When crossing Vest Fjord (where one generally expects during the summer to see some cetacean life) to the Lofodens and back, on the 14th, the sea was too high to allow of our seeing any Whales that might have been there, although others besides myself kept a careful look-out. The following day, to the north of Maalsnæs, we saw a small Whale ; and others, on the 17th and 18th, off the East Finmarken coast. One of these, which I did not see, may have been, from the description, a Humpback, but all that I saw appeared not to exceed 20 ft. in length ; the back-fin appeared small and low. I did not see any of them spout, and they moved somewhat sluggishly. I do not think they were any of the *Balænoptæridæ*, but possibly Pilot or Caa'ing Whales (*Globiocephalus melas*). On the 18th (off Tana Fjord), we passed three whalers cruising ; one, which was about six miles off shore (five from us), fired, and, as she immediately altered her course to nearly the opposite direction, and kept on turning, she was probably “ fast.”

HUMPBAC (Vardö, Aug. 20th).—A male, about 35 ft. long, was entirely black on the under side, except a not clearly-defined patch of white near each point of the under side of the flukes : some very small spots of white on the chin and belly were all, I

think, without exception, scars where *Diadema coronula* had been. There was a large cluster of small examples of this cirriped on the chin, another on each side on the fold of skin covering the penis, a small cluster on the back a few feet from the head, and some on the flippers. The examples were all small, none being of larger diameter than a florin, and there were no examples of *Conchoderma auritum*, unless there were any on the extreme point of the chin (at the symphysis of the lower jaw, which was still under water when I left, when it was getting dark. I noticed that *Diadema coronula* can see on land, at a distance of about one inch, the "cirri" of live examples being retracted when my finger approached within about that distance of them. The flippers of Humpbacks are invariably (with the infrequent exception of a few very small marks) all white on the inner side, but the coloration on the outer side varies considerably. In this individual they were black for only a very short distance at the proximal end. The lower jaw measured 12 ft. 10 in. in a straight line. The fin of the Humpback rises very gradually from fore to aft; a better way of describing it, perhaps, is to say that the line of the back rises gradually for a length of about 4 ft., of which the after 1 ft. 4 in. (as in this example) comprises the actual fin, the posterior free edge being deeply indented, almost a semicircle, and measuring (in this example) $8\frac{3}{4}$ in. from the upper point to the line of the back. The back behind the fin continues level with, or slightly lower than, the line of the back anterior to the base of the fin. The next morning I found that three Humpbacks had been brought in during the night to one of the factories, and two of them were already flensed. One of these measured 44 ft. following the curves; the other was two or three feet shorter. The flipper of the larger of these two measured 14 ft. 4 in. in length, and that of the smaller 13 ft. 10 in. in length, and 3 ft. $4\frac{1}{2}$ in. across at the uppermost projection. About the proximal quarter of the outer side of the flipper of the latter was black, the black extending down the anterior edge, with a few small irregular black marks lower down. The third specimen, a male, measured 42 ft. along the curves, and was entirely black on the belly, but nearly the whole of the thorax (*i. e.*, chest and throat) was white, the chin being black, with a few small white flecks. The concavities of the plaits or ribbings were of a

light purplish flesh-colour. There was a small streak of white about 1 ft. by 3 or 4 in. on the upper lip about half-way along the gape; very little black on the outer side of the flippers, including a narrow rim along the hinder edge. Clusters of *Diadema coronula*, as usual, some individuals being fairly large (but none of them equal to specimens I obtained in 1884), and a few of them had *Conchoderma auritum* attached to them, but no large examples. The gape of the mouth, measured along the curve of the upper jaw, was 9 ft. 10 in. Length of flipper, 12 ft. 11 in. Width of skull opposite blow-holes about 3 ft. 11 in. Tip of nose to inner edge of blow-holes, 8 ft. 2 in. Distance between blow-holes at inner corner, $2\frac{1}{2}$ in. Flukes, fore and aft, at central notch or fork, 3 ft. 8 in. On the 22nd I saw the 'Kiberg' towing rather a small male Humpback, which had evidently been killed a few days previously, as it was much distended. The chin was black, but I could see some white on the under jaw; the throat and chest white, as far aft as the point of maximum girth (the end of the ribbings); the remainder of the lower side black. Capt. Selliken informed me that a foetus of this species, which he had found in June, measured one foot. Capt. Berg told me that he had this season captured the biggest Humpback he has hitherto seen. It was a female, and measured 50 Norwegian feet (52 ft. English) in a straight line (measured as Dr. Guldberg had directed). Its girth was 40 ft., but this would, of course, alter very materially, according to the degree of inflation. The blubber filled two of the large boilers. Capt. Horn told me that on the passage north of his whalers last spring, after passing Nordkyn on March 6th, Humpbacks were very numerous all along the coast. More of this species were killed last season than in any previous year, but this is not necessarily the result of their being more numerous, but because, in the absence of the more profitable species, they were hunted in preference to the least profitable species (*B. borealis*); 96 were killed last season as against about 70 in 1884, a lesser number in 1883, and previous to that year very few, if any at all. The blubber of the Humpback takes rather a longer time to boil down than either of the Rorquals.

BLUE WHALE.—At Yeretiki (Murman coast), on Sept. 1st, I measured the krang of a Blue Whale, which was 79 ft. following the curves, which would not, however, have made 2 ft. difference

probably, and *per contra*, the back was bent, and the under jaw off. Nose to back of blow-holes, 14 ft. Flipper over 10 ft. long, but, as I could not distinguish the head of the humerus in the mass of displaced krang, I was unable to measure it accurately. Greatest width, 2 ft. 7 in. Skull at the widest point (zygomatic arches), 9 ft. 6 in.; immediately in front of the zygomatic arches, 6 ft. In a heap of under-jaw bones of this species at this factory were some very large specimens: one measured $36\frac{1}{2}$ in. in height at the coronoid process; several other maxillæ were piled across it, so I could not measure its length, but another very large ramus, which may have been its fellow, measured 21 ft. 9 in. along the curve; of this one I was unable to measure the height. Some baleen plates here measured 34 in. by 24 in., and would have been probably fully 8 in. wider when in the mouth, before the small inner part was cut off. These were, I think, the largest I have met with. Captain Horn, of Yeretiki, told me of the following measurements (Norwegian) of this species which he had taken this season:—July 12th, female, 85 ft.,* no foetus, very fat, giving about 95 petroleum casks of oil; July 24th, female, 82 ft., with milk running; ditto, male, 75 ft.; Aug. 9th, female, 81 ft. The first Blue Whale killed off Yeretiki was on June 6th, a female, 72 ft. (Norwegian) long. With the exception of Ara (June 15th), I do not know the date of killing the first by any of the ships, except the 'Glimt,' which took one in May, which was considered unusually early.

COMMON RORQUAL.—Capt. Horn informed me that on his passage north with his whalers in the beginning of March, he only saw two or three of this species. He only found one foetus during the season, about 4 ft. (Norwegian) long, in an example killed May 7th, measuring 62 ft. (Norwegian). Capt. Fredriksen (Kobholm Fjord) found a foetus in (he believes) April, about 5 ft. long, and each succeeding one was bigger, until, on July 2nd, he found one about 12 ft. long. A small example, killed by one of Capt. Sørensen's boats on Sept. 7th, measured 57 ft. (English) in a straight line. Nose to blow-holes, 9 ft. 6 in. Nose to eye, 10 ft. 3 in. Length of flipper, 6 ft. 5 in. Spread of flukes,

* These measurements were probably taken following the curves, but, as the Norwegian foot equals almost exactly $12\frac{1}{2}$ in. English, it must at least have been over 80 ft. long.

11 ft. $5\frac{1}{2}$ in. by 2 ft. 10 in. broad, at about 9 in. from central notch. Colour almost black above, shading off on under side, through streaks of grey, to a little white about the centre of each lobe. Transverse diameter of smallest part of tail, close to flukes, 1 ft. $\frac{1}{2}$ in. Between extreme points of blow-holes, 10 in. This specimen was obtained to the westward of Vardö; about the same date several were met with about seven sea-miles (equal to twenty-eight English land-miles), N.E. of Swjatoi Nos,—that is, about one-third of the way across between there and Kanin Nos,—the headlands forming the mouth of the White Sea; but a tug, which towed two individuals back to Yeretiki (Sept. 5th to evening of 7th), saw no Whales of any kind to the westward of Swjatoi Nos. Capt. Sörensen took a Common Rorqual this season 45 ft. long, which was still following the mother, and had only milk in its stomach. Two flippers, which I measured at Skjærsnæs Factory, were 8 ft. 6 in. and 8 ft. 8 in. respectively. These must have belonged to large specimens.

RUDOLPHI'S RORQUAL (Coal-fish or Capelan Whale).—In the year 1884, so far as my information goes,* only five of this species were killed along the whole coast worked by the Fin-whalers, and, though this species is left alone when larger Whales are to be had, yet it is quite certain that it has hitherto only appeared as a straggler to the eastward of North Cape, though, as a rule, it appears in tolerable numbers off the West Finmarken coast (Capt. Bull, from his station on Söröen, killing fifteen in 1883). Last year I was assured that thousands of this species lay off the N.W. point of Söröen for three weeks during June (Capt. Bull, with his two steamers, taking sometimes as many as four a day); and also that an immense number remained off Sylte Fjord (East Finmarken) for about three weeks in May and June; while they were common along the whole coast during nearly the entire season. They appear, however, to have reached the Russian coast rather later, the first killed by one of the Yeretiki steamers being on July 10th, and the first by one of the Ara steamers two days later, which would pretty closely mark the date of their arrival. Herr Weil, who has the establishment on Söröen for tinning the "beef" of this Whale, increased his staff and machinery, but even then could not use all the flesh. The fact that upwards of 770 Rudolphi's

* Namely, from fifteen out of the nineteen companies.

Rorquals were killed last season, although, from the small amount of blubber to be got from them, they are never hunted when there is a chance of any other Whale, fully shows how numerous this species was. I was not fortunate enough to have an opportunity of examining closely a Whale of this species in its entirety, but only a few krangs, among which was that of a male flensed just before I arrived at one of the factories at Vardö on the morning of August 25th. This had been taken off Kildin Island, on the Murmansk coast. It measured 45 ft. along the curves, or probably about 43 ft. in a straight line. Nose to inner edge of blow-holes, 7 ft. 9 in. The blow-holes are set at about right angles to long axis, and adjoin. Width of skull, opposite blow-holes, 3 ft. 6 in. Lower jaw, 11 ft. 6 in., along outside of curve. Although the blubber was cut off, the pieces were still lying close by, showing that the back was jet-black, light greyish slate colour on sides; purplish white on belly, the concavities of the ribbings purple or livid colour, but black extending over part of the ribbings; the amount of grey and white is said to vary in different individuals.* Flukes, fore and aft, to central fork, 2 ft. 9½ in. Black above, light greyish lead-colour underneath. Fin large and upstanding, about 21 in. high, and about 2 ft. 8 in. along the base. The flippers were 6 ft. long, jet-black all over, both sides alike. In the example of Rudolphi's Rorqual from the River Crouch (Essex), I noted the under side of the flippers as white, but (as I had only a hasty look at it) I presume this was a mistake, for Professor Flower, in his description of the same specimen (Proc. Zool. Soc. 1883, p. 514), remarks "the flippers being black," and I this year had the opportunity of examining thirty odd pairs of flippers of this species, and they were without exception entirely black *on both sides*. They may be distinguished from the flippers of the Common Rorqual, besides the colour, by the latter being blunt-edged, like the flat handle of a plain ivory paper-knife, while the Rudolphi's are sharp, like the blade. This is especially noticeable

* In the paper on this species by Prof. Collett, previously referred to, he says that this species during life is not much darker than the Blue Whale. That many (possibly all) species of Cetacea become darker after death is well known, but, while some pieces of the epidermis of the Blue Whale, which I obtained in 1884, remain of a grey-blue colour (not particularly dark), a portion of the epidermis of this specimen is jet-black, as it was when I peeled it off.

at the anterior edge, which in the Common Rorqual is thick and rounded, while in Rudolphi's Rorqual it is nearly as thin as the posterior edge. The longest flipper that I could find among the thirty odd pairs measured 7 ft. $6\frac{3}{4}$ in. to head of humerus. All the saleable portion of the baleen plates were black,* but the small inner portion of many of the plates were white, with from one to two inches of blue-grey between. The bristles would be more accurately described in this species as hair, being soft and fine, and quite white. The longest baleen plates measured about 31 in. by 12 in. A Rudolphi's Rorqual may be distinguished from a Common Rorqual at a glance by the back being jet-black instead of grey-blue, and the white of the under side is much clearer, the whole skin having a fine silky appearance. The black of the upper side is not of a perfectly uniform tinge, but is here and there a shade less intense. This species is so small for the enormous harpoons in use, that I was assured that at least in one instance the harpoon passed right through the Whale, and the shell exploded on the other side! In the individual just described the harpoon was buried to the butt. The bone of the lower jaw of Rudolphi's Rorqual is said to be harder than in either of the other species. The only fœtus of this species found by Capt. Horn this season measured $5\frac{1}{2}$ ft. (Norwegian), on July 28th. The only example which I saw in its entirety was riding to a buoy, in which position I was unable to examine it closely.

Captain Andreeff kindly gave me the following list of all the Whales taken by his steamers into Ara Bay this season; I have substituted the new style dates for the old style (by adding twelve days); the lengths are in feet, which he informed me were identical in Russia and England:—

March 30.	Common Rorqual.	Female.	Length, $61\frac{1}{2}$ ft.
April 4.	„ „ „	„	„ $50\frac{1}{2}$ ft.
„ 9.	Bastard.†	Female.	Length, 68 ft.
„ 29.	„ „ „	„	72 ft., containing fœtus, 3 ft. 4 in. long, and $27\frac{1}{2}$ lbs. Rus. = about 22 lbs. Eng.
May 6.	Common Rorqual.	Male.	Length, 43 ft.

* Prof. Collett has described the variations in the colouring of the plates very carefully in detail in the paper already mentioned.

† I have reckoned the "Bastards" as Common Rorquals in the table on page 136.

May 8.	Common Rorqual.	Female.	Length, 65 ft.
June 8.	"	"	" 62 ft.
" 15.	Blue Whale.	Female.	Length, 70 ft.
" 23.	"	"	" 77 ft. Found dead.
" 26.	Common Rorqual.	Female.	Length ?.
" 28.	"	Male.	Length ?.
July 2.	Blue Whale.	Male.	Length ?.
" 7.	Humpback.	Female.	Length ?.
" 11.	Blue Whale.	Male.	Length ?.
" "	Humpback.	Male.	Length, 49 ft.
" 13.	Rudolphi's Rorqual.	Female.	Length, 40 ft.
" 15.	"	"	" 45 ft.
" "	"	Male.	Length, 47 ft.
" 18.	"	"	" 45 ft. Found dead.
" 22.	Blue Whale.	Male.	Length ?.
" 25.	"	"	" 70 ft.
" 26.	Rudolphi's Rorqual.	Sex, ?.	Length, 40 ft.
" "	"	" ?.	" 43 ft.
" 27.	"	" ?.	" 42 ft.
" 28.	"	" ?.	" 41 ft.
" 29.	"	" ?.	" 42 ft.
Aug. 1.	"	" ?.	" 41 ft.
" 3.	"	" ?.	" 43 ft.
" 5.	"	" ?.	" 42 ft.
" 13.	Blue Whale.	Female.	Length ?.
" "	"	"	" 76 ft.
" 14.	Rudolphi's Rorqual.	Male.	Length, 39 ft.
" 17.	Common Rorqual.	Female.	" 57 ft.
" "	"	"	" 45 ft.
" 19.	Blue Whale.	Male.	Length, 77 ft.
" 20.	Common Rorqual.	Female.	Length, 45 ft.
" 26.	"	"	" 53 ft.
Sept. 9.	"	"	" 45 ft.
" "	"	"	" 63 ft.
" "	Blue Whale.	Female.	Length, 71 ft.

Various accidents occurred among the whaling fleet during the season, the most serious being the loss of the 'Glimt.' She was a new ship last season, owned by a newly-formed company, who established a factory, 'Bugten,' on the mainland, opposite Vardö (close to the 'Thekla' Factory). The manager was Capt. Grönn, who the previous season had been manager of the Kobbholm

Fjord Factory. The 'Glimt' made a very successful beginning, taking a Blue Whale in May.

One rough evening in June, when off Kildin Island, on the Murman coast, her commander, Captain Larsen, was sitting reading in the cabin. The sun being at that time above the horizon throughout the twenty-four hours, there was no light burning, and Capt. Larsen was not smoking. Without any apparent cause the powder, amounting to about 80 kilos. (more than $1\frac{1}{2}$ cwt.). which was kept in the cabin, exploded. Captain Larsen was hurled, frightfully burnt, through the broken skylight, while the vessel was reduced to a complete wreck, and was burning fiercely. The crew took to the whale-boat, taking Capt. Larsen with them, who was completely blinded, the skin being entirely burnt off his face and hands, and otherwise injured. It blew a gale of wind, and for fifteen hours he lay helpless in the bottom of the boat in agonies, which were terribly aggravated by lying in salt water, for the seas broke over the boat constantly, filling it, and every moment threatening to swamp it. He gradually began to lose sensation, the numbness creeping slowly upwards from the feet, and he felt that, if the numbness should reach as high as his stomach, it would put a fatal termination to his sufferings. Happily, before this occurred the boat was picked up by another whaler, which at once steamed off to Yeretiki, the nearest oasis of civilisation, where he received every possible attention at the hands of Capt. Horn. He was thence taken by sea to Vardö, and from there he eventually proceeded home. I am happy to be able to add that he has recovered his sight, and the last account I heard of him was that he was in a fair way to convalescence; but it may be doubted whether he will ever again undertake the command of a whaler where so large an amount of powder on so small a vessel must always be a source of danger, and, though all the managers are going to adopt extra precautions during the approaching season, they expect this accident will largely affect the rates of insurance.

Several accidents have at different times occurred from the premature explosion of the harpoon-shell. A man belonging to one of the East Finmarken boats was badly injured at the beginning of last season in this way, and was an inmate of the Vardö Hospital nearly all the summer.

Capt. H. Ellevsen told me that on one occasion (in 1884), his whaler (the 'Nora') had harpooned a small Whale, which was not heavy enough to open the barbs and explode the shell. A boat went off to lance it, but Capt. Ellevsen, realising the danger from the unexploded shell, ordered them to cut the line. Before this could be done, however, the shell exploded and smashed the boat, fortunately without injuring any of the men, who were all picked up. (A similar disaster nearly befel a boat's crew in lancing a Humpback in 1883, as described in 'The Zoologist,' 1884, p. 420, and similar near shaves are probably not rare). The charge for the harpoon-gun is 15 lod, or $233\frac{6}{10}$ grammes, more than half a pound avoirdupois, while the shell contains, I believe, over $\frac{3}{4}$ lb.; so the whalers are obliged to carry rather a large quantity with them.

Besides these accidents caused by gunpowder, a new form of disaster occurred last season,—the charging, by Whales, at the whaling-ships, or harmless fishing-boats. The following account was given me by Capt. Sørensen, which I have translated as literally as possible from the Norwegian original:—

“Whales were not previously known in these regions to have done so much mischief as during this summer, when, besides destroying several fishing-boats, they also caused damage to certain whaling steamers. The first news of the Whales' destructiveness was during the Capelan-fishing this year, when, at the beginning of the month of May, a fishing-boat, belonging to the commandant of Vardöhus Fort, was run down and entirely destroyed by a Common Rorqual. The crew were with difficulty saved by other fishermen, who were lying in proximity, but the boat and the good catch in it at the time were lost. A short time subsequently two similar wreckings of boats were reported.

“The first whaler which had to sustain a conflict with a Whale was the steamer 'Vardöhus,' belonging to the 'Haabet' Whaling Company. This ship, on the 21st of May, shot a Common Rorqual, which, as it did not die immediately, was given a second harpoon 'in the life,' after which it lay as if dead. So the crew made all ready to heave it in, and go home to Vardö with it; but, to the crew's amazement, it again showed signs of life, and came rushing at a furious pace against the ship, and rammed her at the stern-end, with the effect of bending the rudder and stern-post to one side. It gave the ship butt after

butt, and freed itself at the same time from the two harpoons : at last it quitted the vessel, and it was seen to spout blood at a distance of nearly 100 alen (about 70 yards), but it then turned back again for a charge at the steamer, which could not get away, as both the rudder and propeller were rendered useless by the first collision, and struck the steamer this time at the bow, without, however, causing damage. After this the Whale was not seen, and the 'Vardöhus' was next day towed in by one of her colleagues to Vardö, where eight days were passed before the ship was again in a condition to take the sea.

"In the month of July the steamer 'Fiskeren,' belonging to the 'Laurvig' Whaling Company, was damaged in the same manner, likewise by a Common Rorqual, and had to go to Tromsö to have the injury repaired; and finally, in the month of August, the steamer 'Pasvig,' belonging to the Whaling Company of the same name, was charged by a Whale, which struck her amidships, close by the engine-room, and with such force that three iron buckets were broken, several iron bolts were loosened, and the plates were deeply dented. Fortunately the steamer's injury was so high out of the water that she did not fill with water, as in all probability would have been the case if the injury had been situated under the water-line."

I have the following few alterations and additions to make to the table of the different companies and their takes in 1884, published in 'The Zoologist' for 1885, p. 143:—

S. Foyn himself managed his factory at Böle (on Söröen) in 1884. Since then the Vadsö factory has remained closed, and Bull has managed Böle, while Foyn conducted his new establishment at Mehavn. The Kiberg Company only had one whaler last year. Sylte Fjord Company should have been called the Bergen Whaling Company, M. A. Selliken, manager, Foden being the captain of the whaler 'Skytten.' She took 10 Blue, 8 Fin, 0 Rudolphi's, 7 Humpbacks; and this total (25) includes one Whale found dead. This season the establishment is Capt. Selliken's own. The other establishment in Sylte Fjord (Dahl's, who is now dead), took 8 Blue, 5 Fin, 0 Rudolphi's, 10 Humpbacks; total 23. At Tu Fjord, the name of the manager is Andreasen.

The alterations in the spelling of the Russian factories are according to the latest local fashions. "E" at the commencement

of a word in Russian has the equivalent force of the English "Ye"; the reduplication of the "r" in Ara seems somewhat arbitrary, but the single letter is possibly the more correct, and the addition of "Guba," = Fjord or Gulf, is necessary, as the omission is more meaningless than talking of "Forth" or "Pentland," &c., without the word "Firth" would be, as the latter are named from some place on the land; but Ara is, I believe, simply the name of that Fjord.

It will be noticed that nearly all the companies have given up employing tug-steamers since the previous year.

In the following table of the whaling companies and their takes in 1885, the new names, whether of companies, managers, or ships, are in italics; I believe the numbers of Whales here given to be very nearly exact, within half a dozen probably. A dead Humpback drifted ashore on Kildin Island (Murman coast) early in September; it was flensed on the spot by a colonist, and the oil was subsequently sold to Yeretiki. I believe this example is not included in the return thence; and, on the other hand, Whales killed at a distance from the factory to which the steamer belongs are occasionally sold to the nearest factory, and may *possibly* appear in the totals of both establishments. There may possibly be other sources of slight error.

There is said to be a third company now established on Söröen, at Aker Fjord; manager, Sörensen; port of register, Arendal; with one vessel, the 'Neptun'; but, as I have not succeeded in learning any particulars except the popular report that the take had been *nil*, I have not included it in the table.

I have to express my indebtedness to my friend Prof. Collett, who had included a similar (but rather less complete) table in the MS. of his paper before mentioned, given him by Captain Sörensen, but at once courteously withdrew it on finding that I had a sort of "prior claim," having arranged it myself, and ascertained the majority of the figures. I have also to thank Capt. Sörensen for supplying me with many of the items; and several of the other resident managers as well, some of whose names are mentioned in the preceding pages.

COMPANY.	MANAGER.	PORT OF REGISTER.	WHALEERS.	BLUE WHALES.	COMMON RORQUALS.	RUDOLPH'S RORQUALS.	HUMPBACK.	TOTAL.	WHALEERS' NAME.
<i>East Finnmarken</i> : Kobholm Fjord	<i>Fredriksen</i> ...	Sandefjord...	2	0	25	50	3	78	Skjold, Værgø.
Stokke, Pasvig	A. Ellevsen ...	Tönsberg ...	2	5	32	43	7	87	Varanger, <i>Pasvig</i> .
Jar Fjord	Evensen ...	Do.....	2	3	45	40	5	93	Jar Fjord, Hvalen.
Do., Madvig	L. Hansen....	Christiania ..	1	0	18	16	3	37	Madvig.
Do., Tamasjok	C. Bruun ...	Tönsberg ...	1	4	10	13	0	27	Emanuel.
Kiberg	Wiborg	Thronhjelm	2	0	21	58	3	82	Kiberg, <i>Nidaros</i> .
Mainland opposite Vardö— Christiania Whaling Co. ...	Castberg	Christiania ..	2	2	24	66	7	99	Alpha, Beta.
Do., Laurvig Whaling Co.	Berentsen	Laurvig	2	2	30	64	2	98	Fiskeren, Nimrod.
Do., "Thekla"	I. Bryde	Sandefjord...	1	0	18	44	3	65	Thekla.
Do., <i>Bugten</i>	A. Grønn	Do.	1	1	5	0	0	6	<i>Glimt</i> .*
Vardö, "Haabet"	G. Sörensen ..	Do.	2	0	20	48	8	76	Vardohus, Haabet.†
Do., Skjærsmæs	H. Ellevsen...	Tönsberg ...	2	2	27	60	9	98	Nora, <i>Otter</i> .
Sylte Fjord	M. A. Selliken.	Bergen	{ 1 and a tug }	1	34	41	6	82	Skytten.
Do., the late Dahl's Establishment.	Berg	Tönsberg ...	1	1	18	32	7	58	Victoria.
Foy'n's Establishm'ts, <i>Mehavn</i>	S. Foy'n	Do.....	2	0	0	31	1	32	Gratia, <i>Arctic</i> .†
<i>West Finnmarken</i> :	T. Bull	Do.....	2	2	30	36	5	73	Spes-fides, Providentia.†
Do., Böle, on Söröen.....	M. C. Bull....	Do.....	2	3	59	47	8	117	Fin, Frey.
Sörvär, do.	Andreasen....	Do.....	2	1	12	35	14	62	Nordkap, <i>Nordkyn</i> .
Tu Fjord.....	J. Gjæver	Tromsø	1	1	6	0	1	8	Duncan Grey.
<i>Tromsø</i>	P. A. Horn ...	Petersburg...	2	12	23	34	2	71	Welda, Murmanetz.
<i>Murmanski Coast</i> : Veretiki	Andreeff.....	Do.....	{ 2 and a tug }	10	15	13	2	40	{ Helena, Pokrof, Vlady- mir (tug).
Ara Guba	(Capt. Imp. Russ. Navy)	Do.....	1	8	1	0	0	9	<i>Emma</i> .§
Do.	Goebel	Do.....	36, 2 tugs	58	473	771	96	1398	

* Lost through explosion in June.

† The latter only fished during first part of season.

‡ 'Martha' laid up the whole season.

§ Only commenced in July.

A REVIEW OF THE SPECIES OF THE GENUS *NUMENIUS*.

BY HENRY SEEBOHM.

THE Curlews belong unmistakably to the Scolopacine group of the Charadriidæ. If the bill from the frontal feathers to the tip be divided into four equal parts, the whole of the nasal orifice is found to be situated well within the basal fourth part. From two large groups of Scolopacine birds, the Snipes (*Scolopax*) and the Cleft-toed Sandpipers (*Tringa*), the Curlews may easily be distinguished by the presence of a rudimentary web at the base of the toes; but to distinguish them from the other Scolopacine genera is one of those ornithological puzzles that can only be satisfactorily solved when a careful series of anatomical studies has been completed.

The earlier writers on Ornithology, of whom we may accept Brisson and Linnaeus as typical examples, attempted to diagnose the genera of birds. To the best of their ability they endeavoured to enumerate the characters which were sufficient to determine the genus, leaving out of the diagnosis other characters, which may be very interesting and very important, but are not absolutely necessary. Modern ornithologists belong to two schools: those belonging to the old school, than whom no better examples can be found than Yarrell, Newton, and Saunders, simply enumerate the so-called structural characters, leaving the reader to find out for himself, if he can, which of them are diagnostic. No great fault can be found with this mode of procedure, except perhaps that it may be regarded as an attempt to "play for safety," which not unfrequently proves a great incentive to the use of strong language on the part of the bewildered but irascible student, who tries in vain to determine the genus of a strange bird.

Dresser, in his 'Birds of Europe,' has adopted a most original course: he has simply catalogued the structural characters of the type of each genus, without pointing out which of them are common to all the species of the genus, and which of them are exceptional; and, of the former, without a hint as to whether they are common to allied genera, or are diagnostic of the genus, the type of which he is describing. This treatment of the question can only be regarded either as a

lame attempt to shirk the difficulty, or as a roundabout mode of expressing his ignorance of the characters of the genus.

The new school of modern ornithologists, of whom Coues, Baird, Ridgway, and Sharpe may be accepted as typical examples, boldly take the bull by the horns, and attempt to construct diagnostic keys to the genera. They may or may not be successful,—unfortunately many of these keys are lamentable failures, and will not turn in the lock,—but all honour to the men who at least try to give definiteness to our knowledge. A short clear definition, even of our ignorance, is better than pages of oracular wisdom.

I find it impossible to construct an entirely satisfactory diagnosis of the genus *Numenius*. Baird, Brewer, and Ridgway place the Curlews in their family *Scolopacidæ*. It is a matter of no importance to the argument whether the group of birds to which the Curlews belong, which consists of the Snipes, Sandpipers, and their allies, be regarded as a family or a subfamily. I think that they ought unquestionably to be looked upon as belonging to the same family as the Plovers and their allies, inasmuch as no line can be drawn between the two groups which is not obviously an arbitrary one. For the sake of argument, however, I am prepared to admit that the classification of the group of birds which are called *Limicolæ* has been accomplished to such an extent that the *Scolopacidæ*, as limited by Baird, Brewer, and Ridgway, can be diagnosed, though the characters may not be as satisfactory as could be wished. The diagnosis of the genus *Numenius*, according to these authors, is as follows:—

Scolopacidæ having a strongly decurved bill, longer than the tarsus and middle toe.

The objection to this diagnosis is that it excludes two species which have always been admitted to the genus, *Numenius borealis* and *N. minor*. What have these poor Curlews done that they should be turned out into the cold? It is rather a remarkable fact that they are the only Curlews which have neglected to make any attempt to produce pale bars on the inner webs of their primaries. This neglect may be a specific misdemeanour, but can scarcely be regarded as a generic crime!

Let us see what Coues can do for us. His diagnosis of the genus *Numenius* may be tersely expressed as follows:—

Scolopacidæ having a very long decurved bill, and having the tarsus scutellated in front, and reticulated behind.

This diagnosis is extremely satisfactory, with one exception. It excludes *Numenius minor* from the genus. This species has the whole of the tarsus unmistakably scutellated, both in front and at the back, and is in every respect a *Totanus*, except, perhaps, that no species of *Totanus* has the bill quite so much decurved. The difference in the amount of curvature of bill between *Numenius minor* and *N. phaeopus* is, however, greater than that between *N. minor* and *Totanus bartrami*. Those ornithologists who are still wedded to the rostral system may, if they like, accept the following diagnosis of the genus *Numenius*:—

Scolopacidæ having the arch of the bill sufficiently great that a straight line, drawn from the gape to the point where the two mandibles meet at the tip, will pass below the lower outline of the under mandible; and (to exclude *Ibidorhynchus*), having the lower half of the tarsus scutellated in front.

The student may inquire why, if the so-called structural characters are so unsatisfactory, do you not settle the matter by appeal to the colour-test? Because colour, and more particularly pattern of colour, dates much too far back to distinguish such closely-allied genera as *Numenius* and *Totanus*. The only important point in which *Numenius borealis*, *N. minor*, and *Totanus bartrami* differ in colour, or pattern of colour, is that the latter species has barred primaries, but unfortunately *T. bartrami* is the only *Totanus* that has barred primaries, and *N. borealis* and *N. minor* are the only species in the genus *Numenius* that have plain primaries.

This is clearly a case for the anatomist to decide, but in the meantime a wise conservatism may allow the two species to remain in the genera in which the instinct of ornithologists has already placed them.

The genus *Numenius*, like *Totanus* and *Charadrius*, may be in a transition state as regards the scutellation of the tarsus. *Numenius minor* and *N. borealis* are so nearly allied that it is difficult at once to find a perfectly satisfactory character upon which to separate them, but, though it is a remarkable fact that the back of the tarsus of the former is distinctly scutellated, whilst that of the latter is as clearly reticulated, the fact is not

an isolated one. The case is almost an exact parallel to that of *Totanus incanous* and *T. brevipes*, and it is worthy of note that in both cases the New World species is the one which has what is generally regarded as the older form of tarsus (*i. e.*, reticulated instead of scutellated), but in the Curlew this character is normal, whilst in the Sandpiper it is exceptional.

The geographical distribution of the species belonging to the genus *Numenius* is very interesting, and presents a remarkable similarity to that of the species composing the genus *Hæmatopus*. In many respects the habits of the Curlews resemble those of the Oystercatchers; both groups of birds are principally shore-feeders, and both are occasionally found on the banks of great rivers. The Curlews undoubtedly breed further inland, but the lines of migration of both groups appear to be similar, and it is not improbable, as will hereafter be shown, that they started from a common centre, and may have even migrated in company. In both genera the species may be ranged in four or five groups, apparently originating in the relation caused by their having chosen different coast lines leading from the Polar basin.

The species belonging to the genus *Numenius* may be naturally divided into five groups, as follows:—

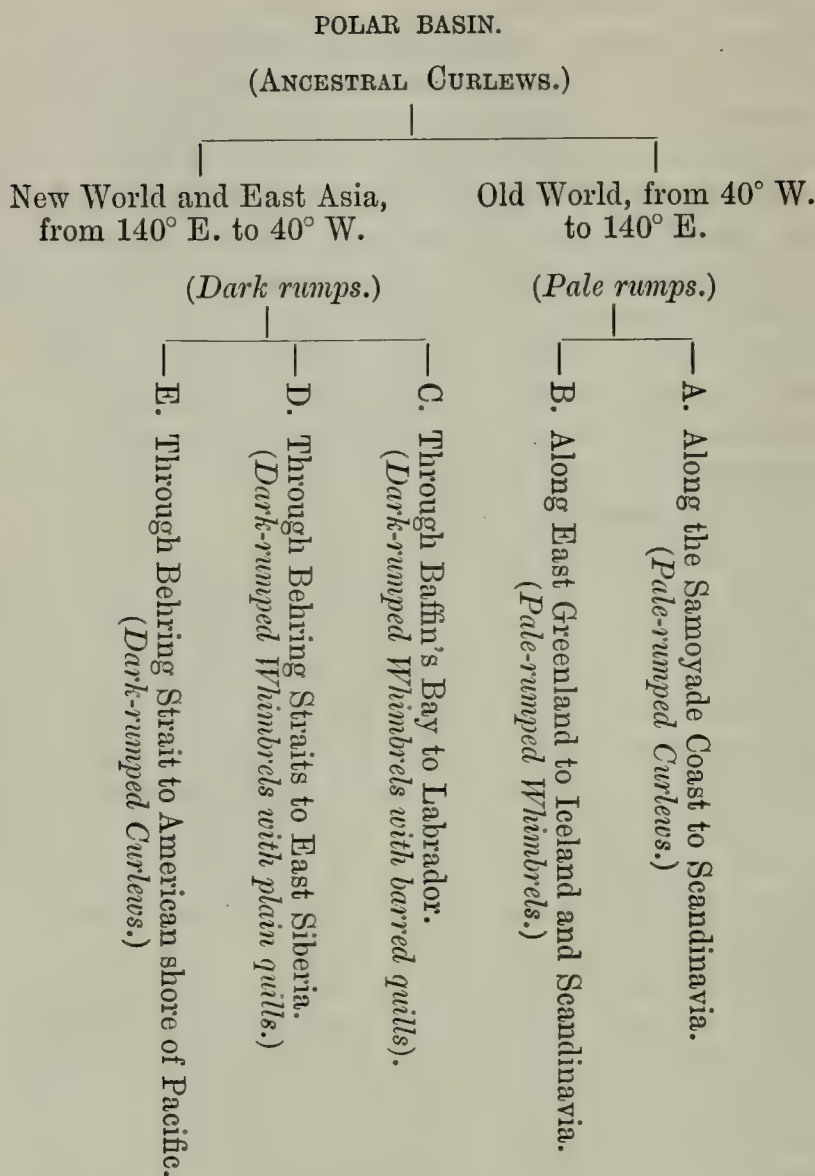
Lower back much paler	}	A	}	Crown plain brown, with a more or less distinct pale mesial line.
than mantle		B		
		C		
Primaries and secondaries	}	D		
nearly uniform brown		E		

Assuming that the ancestors of the genus were originally inhabitants of the Polar basin, let us first ascertain the probable routes which they would take to escape from the gradually accumulating Arctic ice, and, secondly, what evidence, if any, can be found of the origin of each group.

We may picture to ourselves the ancestors of the species now placed in the genus *Numenius* living in the temperate region of the Polar basin, with other shore birds, during the series of interglacial years, immediately succeeding the Glacial Period which isolated and differentiated them into species, these species being

the parents of the present genera. Most species of shore birds were then, no doubt, circumpolar, crossing and recrossing the Polar basin at will, their wandering habits originated and perpetuated by the annual necessity of making a short trip every winter into more tropical climates a little to the south, not in search of food, nor in search of warmth, but in search of light, until at last some species acquired the habit of feeding at night, and were then able to live all the year round in a region subject to annually recurring periods of perpetual night. The comparatively small area of the Polar basin offered every facility for interbreeding, the condition of life remained the same throughout the shores of the Polar Sea, and neither isolation nor its usual concomitant differentiation took place. But the coming on of a Glacial Period changed all this.

The first important break in the continuity of the area of distribution of the Curlews must have been a wedge of ice coming down from the North Pole and extending along the mountains of Greenland, and isolating the American Curlews from the European ones on the Atlantic coasts. This was probably speedily followed by two enormous glaciers, one extending from the North Pole to the Rocky Mountains, and the other to the mountains of Eastern Siberia. This great central glacier thus separated the Curlews into two great colonies, an Atlantic Coast and a Pacific Coast colony. Later on, when the Arctic ice filled the Polar basin, the Curlews retreating before it must again have been compelled to split into two parties, one following the Pacific shores of Asia and the other the Pacific shores of America. In like manner the Atlantic colony naturally split into parties, but it had three instead of only two available routes of escape from the ice. One party, no doubt, found its way down Baffin's Bay, a second party followed the coast-line to Europe, whilst the third party, which followed the east coast of Greenland, finding its west coast already occupied by the Baffin's Bay Curlews, naturally took the shortest flight to land, and also reached Europe *viâ* Iceland and the Faroes. The theoretical distribution of the Curlews would, if this hypothesis of their origin be correct, resemble the following plan :—



The reason for assigning the various routes to the subgeneric groups of species placed below them are as follows :—

Of the two species with dark rumps and plain primaries, one breeds in East Arctic Siberia and the other in Arctic America. As the latter is unknown on the Pacific Coast, it is most probable that it did not emigrate along the American shores of the Pacific, but is the result of a later emigration across Behring Straits to Arctic America.

Of the two species with dark rumps and uniformly striated crowns, one breeds in East Siberia and the other in sub-Arctic America. As the latter is more common on the Pacific coast of that continent than on the Atlantic, there is every reason to suppose that this group represents the Curlews which emigrated through Behring Straits along the American shores of the Pacific.

Neither of the two species with Whimbrel markings on the head, dark rumps, and barred wings, are found in the Old World, except that one of them is said to have occurred in Kamtschatka. They probably came down Baffin's Bay, as the Hudsonian Whimbrel has occurred in Greenland and once in Iceland. It is uncertain whether the Pacific Island Whimbrel breeds in Kamtschatka or in Alaska, but at all events it appears to be unacquainted with the coasts of China.

The pale-rumped Whimbrel is so common in Iceland and the Faroes that it is natural to suppose that it emigrated to the Arctic Regions of the Old World by way of those islands along the east coast of Greenland, where it is still found, and whence it has gradually spread to East Siberia. In the latter locality its rump is considerably streaked, leading to the supposition that when its range first touched that of its dark-rumped allies the species had not become quite so completely differentiated as they appear to be now, and that consequently some interbreeding took place between them, which has left its permanent mark on the eastern form of the Common Whimbrel.

The Pale-rumped Curlews, being represented by two species in Europe, one in Asia, and being entirely absent from America, doubtless escaped from the ice from the Kara Sea, along the European coast, and up some of the great rivers of Western Siberia.

The first group to be considered may be described as Pale-rumped Curlews. They may be diagnosed as having the rump white, or white more or less streaked with brown, but with no mesial line on the crown. They represent the Atlantic coast Curlews of the Old World, and consist of two species, one of which is perhaps divisible into two subspecies.

1. NUMENIUS ARQUATUS.

2. NUMENIUS ARQUATUS LINEATUS.

The range of the Common Curlew extends across Europe and Asia from the Atlantic to the Pacific: it only reaches the Arctic Circle in its western portion under the influence of the Gulf Stream, but to the south it includes the whole of the Ethiopian and Oriental Regions. To the colder portion of its range the Curlew is only a summer visitor. In the British Islands it is a resident, but in the Tropics it is only seen during winter.

Asiatic examples are slightly paler in colour, and have, as a rule, fewer streaks on the rump, and no bars or dark markings on the axillaries, which are snow-white. These characters are not very constant, and the two former completely intergrade, but, if the Eastern form be regarded as subspecifically distinct, it must bear the name of *Numenius arquatus lineatus*.

In the basin of the Mediterranean the Curlew is principally known as a spring and autumn visitor on migration, but in that district a closely-allied, though perfectly distinct, species is a resident. The fact that the range of the second species does not extend further east than the Ural Mountains confirms the theory that the Pale-rumped Curlews escaped from the Polar basin when the coming on of the Glacial Period drove them south, along the Atlantic shores of Europe. At the height of the Glacial Epoch they were probably isolated, in two colonies, one in West Africa and the other in the Valley of the Nile, for a period long enough to make them specifically distinct. When the Glacial Epoch had passed away, the West African colony spread over the basin of the Mediterranean, whilst the East African colony extended its summer range over the head of its ally east and west, until it finally extended from the Atlantic to the Pacific, whilst its winter range covered South Africa, and afterwards reached India, Burma, and the islands of the Malay Archipelago. The complete isolation of the African and Asian winter colonies of the Common Curlew produced variation in the species, but the uninterrupted area of their distribution in summer, combined with the much shorter period during which they have been isolated, have prevented the birds from these colonies from becoming completely differentiated.

3. NUMENIUS TENUIROSTRIS.

The Mediterranean Curlew is much smaller than its more southern ally, and has a bill relatively more slender. It combines the colours of the Common Curlew with the dimensions of the Hudsonian Whimbrel. A simple diagnosis of the Mediterranean Curlew is *axillaries pure white, tarsus less than three inches long*: no other species in the genus possesses both these characters.

It is a resident in the basin of the Mediterranean, occasionally breeding as far north as latitude 50°, especially in South-east Russia, where it is a migratory bird. It has not been recorded from any locality east of the Ural Mountains. In Africa its numbers are increased in winter by migrants from Europe, but it is unknown in Tropical Africa.

The second group comprises the Pale-rumped Whimbrels, which may be diagnosed as having the lower back and rump white, more or less streaked with brown, but always contrasting with the darker mantle, and the crown plain brown, with a pale mesial line. They represent the birds which left the Polar basin along the east coast of Greenland, and, finding the west coast already occupied, crossed over to Europe by Iceland and the Faroes. From their present arctic habits it seems probable that they never crossed the Mediterranean, but remained during the Glacial Period on the outskirts of the ice, which they followed on its retreat, until they finally spread over the Arctic Region of the Old World. Only one species is known having an eastern and a western form.

4. NUMENIUS PHÆOPUS.

5. NUMENIUS PHÆOPUS VARIEGATUS.

The Common Whimbrel breeds in the Arctic Regions of Europe and Asia from Iceland to Kamtschatka, wintering in the Ethiopian, Oriental, and Australian Regions. Eastern birds have always longitudinal streaks on the white rump, a character which is only found in the young of the western race, and then never to the same extent as in the adult of the eastern birds. In consequence of this peculiarity the eastern birds have been named *N. variegatus*.

The birds comprised in the third group have the rump nearly the same colour as the mantle and lower back, the crown uniform dark brown, with an obscure pale mesial line, and more or less distinct bars across the primaries and secondaries. They are supposed to represent the birds which emigrated down Baffin's Bay and the chains of American lakes. After the passing away of the Glacial Period they seem to have spread westwards to Behring Straits, and possibly to East Siberia. Two species are known.

6. NUMENIUS TAHITIENSIS.

The traces of pale bars on the inner webs of the primaries of the Pacific Island Whimbrel effectually prevent its being confused with the two smallest Whimbrels, though it agrees with them and differs from its nearest ally, the Hudsonian Whimbrel, in having the lower breast and belly buff instead of white.

The Pacific Island Whimbrel has occurred on the Sandwich Islands, the Society Islands, the Samoan Group, and on some other islands of the South Pacific Ocean, where it is probably only a winter visitor. A single example has been obtained in Alaska, and Taczanowski records it from Kamschatka, which are presumably the breeding-grounds of this species.

7. NUMENIUS HUDSONICUS.

The Hudsonian Whimbrel is sufficiently distinguished from its dark-rumped allies by the whiteness of its lower breast and belly, and by the distinctness of the pale bars on the inner webs of its primaries.

It is confined to the Arctic Regions of the American continent during the breeding season from Alaska to Greenland, but in autumn it migrates southwards across the line, where it has been seen as far south as Patagonia.

The birds comprised in the fourth group may be called Plain-winged Whimbrels, and are easily distinguished from all their allies by the absence of bars on their primaries and secondaries. They appear to represent the birds which escaped from the Polar ice through Behring Straits, and after-

wards followed the Siberian coast. Two well-defined species are known.

8. NUMENIUS MINOR.

The Least Whimbrel probably breeds somewhere on the coast of Eastern Siberia, as it is known to pass through Dauria and Japan on migration, and winter in Australia. It is very closely allied to the Eskimo Whimbrel, but differs from it in being slightly smaller, rather longer in the tarsus, and rather paler and less barred on the under parts. A more important distinction is to be found in the scales at the back of the tarsus, which are arranged in hexagonal reticulations in *N. borealis*, but in transverse plates or scutellations in *N. minor*.

9. NUMENIUS BOREALIS.

The Eskimo Curlew, having a distinct pale mesial line on the crown, ought to be called the Eskimo Whimbrel. It differs from all its congeners, except from its Siberian ally, in having scarcely any traces of pale bars on the inner webs of its primaries or secondaries. The differences between the two species have already been pointed out.

The Eskimo Whimbrel is essentially an Arctic bird, breeding only on the tundras of North America, above the limit of forest growth, from Behring Straits to Greenland. It winters in South America, where it has occurred as far south as Patagonia. It is not known on the Pacific Coast.

The fifth and last group consists of the Dark-rumped Curlews. They may be diagnosed as having the rump pale brown, streaked with dark brown, like the mantle and lower back; and the crown pale brown, each feather having a dark centre. They appear to represent the birds which passed through Behring Straits, and followed the American shore of the Pacific. Returning north, after the ice had disappeared, they spread eastward to the Atlantic, whilst a party crossed the Behring Sea into East Siberia, where they became differentiated into a closely allied, but now perfectly distinct, species.

10. NUMENIUS LONGIROSTRIS.

The American Curlew differs from the three European Curlews in two very conspicuous points. In the first place the rump, instead of being pure white with or without streaks, but in either case in strong contrast to the darker mantle, scarcely differs in colour from the rest of the upper parts; and, in the second place, the axillaries, instead of being white barred or unbarred with brown, are uniform deep buff. It may be distinguished from its Siberian ally by the absence of bars on the axillaries, or by its rich buff under parts unstreaked on the lower breast and belly. It breeds in Temperate North America, and winters in Mexico and Central America, but is a resident in many of the intervening districts.

11. NUMENIUS CYANOPUS.

The Australian Curlew scarcely differs from its American ally, either in dimensions or in the colour of its upper parts. It may, however, be easily distinguished by the colour of the under parts, which (including the axillaries) are nearly white, streaked and barred with brown.

Like its ally in the New World, it is a migratory bird, but the migrations of the Curlews on the Asiatic shores of the Pacific are on a very different scale to those of their cousins on the American shores of that ocean. The Australian Curlew breeds in South-eastern Siberia, from Lake Baikal to the mouth of the Amoor, passes along the coasts of Japan and China on migration, and crosses the line to winter in Australia.

One more point is worthy of consideration in connection with the geographical distribution of the genus *Numenius*. What light, if any, does its farthing candle cast upon the Zoological Regions of Sclater and Wallace? Of the five groups into which this genus appears to be naturally divided, four find one boundary in the Atlantic Ocean, two find their other boundary in the Valley of the Yenesay, and two at Behring Straits, whilst the boundaries of the fifth are not yet ascertained.

FIELD NOTES FROM NORTHERN ICELAND.

BY HENRY H. SLATER AND THOMAS CARTER.

ON June 22nd, 1885, we landed in the north-west of Iceland, and our guide with a cavalcade of ponies at once galloped in to meet us. As the latter required a short rest, we fixed on midnight of the day following for a start, and next day took a walk to see the country. We noted a Raven's nest and a great many Ravens, several Long-tailed Ducks, more Pintails, still more Eiders, with Whimbrel, Golden Plover, Dunlin, Purple Sandpipers, Black Guillemots, Kittiwakes, and one immature Glaucous Gull.

At midnight, after a good deal of trouble in getting our effects properly packed into saddle-boxes, after the custom of the country, we started. It did not look like midnight, of course, in these high latitudes.

For three days we travelled almost incessantly, enjoying a great deal of magnificent scenery, but having a very lively time of it, what with the north wind and snow showers, rough roads (mere sheep-tracks), rivers to be forded, and marshes and snow fields to be crossed. We kept guns and binoculars ready, and picked up any eggs and skins we wanted, whenever we had a chance. Of the former we took, amongst others, Pintail and Red-necked Phalarope (the Grey Phalarope we never met with, though it has occurred); in skins all that is worthy of mention is a drake Harlequin which S. shot, and whose body made the *pièce de resistance* of a breakfast for us. Of this bird we saw a good number. We noted also a Falcon, a Heron (a rare occasional visitor to Iceland), Snow Buntings (the males of which looked at a distance like exaggerated cabbage butterflies; their song we duly appreciated; it is not unlike, but hardly equal to, that of the Lapp Bunting), some Geese, Pintail, Harlequin, Scaup, Teal, Common, and Golden-eye Ducks (S. is confident that he saw one male of the common Goldeneye, but *C. islandica* is, of course, the prevailing species of the country), Slavonian Grebes, and Great Northern Divers. Besides these we saw, of course, White Wag-tails, Wheatears, Meadow Pipits, Ravens, Dunlin, Ringed Plover, Arctic Terns, Golden Plover, and Whimbrel, which are to be seen in all parts of Iceland, and the last two of which the

ornithological traveller before long gets almost weary of seeing and hearing.

Nothing need be added to this account of our first three days, except, perhaps, that we had a new experience in gastronomy. We had noticed at the port at which we landed that catching sea birds (principally Guillemots and Razorbills) was quite an industry, and we wondered what they did with them. We discovered that, like dried fish and sea-birds' eggs, they formed an important article of food, and were carried to the farms far inland, at one of which we tasted them. They were very dark-coloured, and full-flavoured, but tasted a good deal better than could have been expected, yet nearly as fishy as the codfish, which formed the second course.

To get to our first real working ground we had to cross a long sea loch, a range of hills, and a river. The loch was easily managed. We went across with our traps in a boat, the ponies went round some miles by a ford, and 10 o'clock p.m. on June 26th found us mounting and *en route* to cross the hills (1660 feet). We had a fair road to begin with, though the gradient was steep, but the road came to an end before long, and we went across bog, still ascending (N.B. In Iceland bogs do not require level ground for their existence). At last we came to a great snow slope, at about the same angle as an ordinary house-roof, up which we went in a slanting direction. We were not particularly anxious to travel on foot, as we had thigh boots and much clothing on, to say nothing of guns, cartridges, egg-boxes, and other impedimenta slung about us; but we had to dismount, as the ponies kept getting up to their middles in the snow (as did we occasionally). However, this was a trifle to the top, which we reached about 2 a.m. Here it was pretty flat, and the snow dreadfully slushy, the ponies (and ourselves) sinking in about every third step. The poor baggage ponies, whose loads could not be removed, were nearly knocked up, and kept helplessly lying down. It really looked like a bivouac where we were. However, in time we began to descend a little; the ground got firmer, and at last we were able to mount.

Crossing a patch of black boggy earth, S. happened to catch sight of a bird fluttering away from almost under a baggage pony's feet, so he jumped off at the spot and found a nest with four eggs. Dropping his gun-cover and sling to mark the spot, he slipped a

cartridge into his gun, and followed the bird, and in a minute returned carrying a female Purple Sandpiper. The nest (which had a pony's footprint within two inches of it—a near shave!) was placed in a hollow of a tuft of *Dryas octopetala*, and was built—very substantially for a Wader's nest—of *Dryas* and *Salix lanata* leaves, grass, two white Ptarmigan feathers, and some down.

We continued to descend, enjoying the magnificent view, and crossed the rapid river at the bottom in a boat. The ponies, as usual, had to swim; a drove of them crossing a river is an extremely pretty sight. A short canter after this brought us at 4 a.m. to a Lutheran manse, at which we proposed to stop for a few days. Without any ceremony we promptly went to bed in the guest-room, S. on the sofa and C. in the recess bed.

We rose a little before 10, and after breakfast went to the neighbouring birch woods to collect. Of our doings at this place we need give only a short account.

Redwings were pretty plentiful in the birch woods. Numbers of fledged young were on the wing. C. found a nest on the ground among the birches with four perfectly fresh eggs. Headless Redwings and Golden Plovers, here and there, furnished evidence of the presence of birds of prey; the former killed, probably, by Merlins, the latter by Falcons.

We found the Rock Ptarmigan (*Lagopus rupestris*) fairly abundant here, and obtained both birds and eggs. It frequents the birch scrub, and is a true Ptarmigan, with a voice like a frog. It is excellent eating, and we made savoury stews of the bodies of those we skinned. Mr. Lock, in his 'Guide to Iceland,' considers the Icelandic Ptarmigan to be usually a hybrid between the Willow Grouse (*L. albus*) of N. Europe and N. America, and the Common Ptarmigan (*L. mutus*), and believes that pure birds of both species may be found also. With this opinion no one who has had the opportunity of examining critically a number of specimens will agree; the explanation of it may be found in the difference between the redder summer and the greyer autumn plumage of *L. rupestris*. No modern ornithological writer, since the species were satisfactorily differentiated, has said anything in agreement with Mr. Lock's view, nor are any specimens known to exist in collections which bear it out. Mr.

Lock will do well to reconsider his verdict with a view to his next edition. See 'Ibis,' 1885, p. 376; 1886, p. 49.

The Mealy Redpoll we found abundant in the birch woods, and took two nests, with six and four eggs, and a boy brought in another. The nests were made of birch twigs, lined with grass, both interlaced with sheep's wool; a thick inner lining of white Ptarmigan feathers completed the structure. One nest was in the fork of a birch tree, about four feet from the ground; the other almost upon the ground, on a bank side. See 'Ibis,' 1886, pp. 46-7.

Of the Snow Bunting we obtained several nests. They are rather stupid birds, and are either excessively shy or absurdly tame. Their nests, which are placed in a narrow crevice in a rock, in some wild gill near the snow line, are large, loose, and untidy, like those of the Yellowhammer, and are made of moss and roots, lined thickly with grass, and again with Ptarmigan feathers. One nest we saw contained a large lump of cow's hair carelessly put in. The complement would seem to be six eggs, but a nest we took had only four, which were much incubated.

Ravens were not uncommon. The number of eggs of other birds which these and Richardson's Skuas dispose of, must be a very large proportion of those laid. There is no doubt that they especially keep in check the numbers of the Golden Plover and Whimbrel by devouring, throughout Iceland, thousands of the eggs of each. Doubtless, also, they do nearly as much towards thinning the Ptarmigan as man with his guns and snares. We were too late for Ravens' eggs, but from a nest in a lonely gorge we took young birds, almost fledged, which had been fed liberally on birds' eggs and crow-berries. (Has this circumstance any connection with the latter name?) We also heard young birds calling from their nests in the cliffs elsewhere.

The Northern Wren (*T. borealis*) was not unlikely to occur in this neighbourhood. We hunted and listened for it most carefully, but neither saw or heard it, nor found a nest, new or old; nor did our collectors bring any in, or lead us to suppose that they were likely to do so. In fact, we never met with anyone in northern Iceland who seemed to know more of it than the name. Four eggs of the Turnstone were brought in, which is all we saw of this bird in Iceland.

We shot three pairs of Richardson's Skua, of which only two

birds were in the light plumage. None of the females seemed, from the state of their ovaries, to be within a month of laying. In one the oviduct had not commenced to curl. Yet we saw them invariably in pairs, and it was getting well into the short Icelandic summer. C., too, is sure that he was near eggs on one occasion—though he could not find them—from the behaviour of another pair of birds.

Having pretty well worked out the locality, our friend and host, the pastor, procured ponies for us, and we moved on some ten miles, to a very comfortable farmhouse near a lake. The pastor very kindly accompanied us, thinking that his slight knowledge of English might be of assistance to us in coming to an understanding with our new host. He rode like a Centaur on a very good pony of his own, and passed his time on the way in belabouring our two inferior beasts with a very persuasive implement of the dog-whip type. The first time he tried this, on S.'s pony, its rider, not expecting any such delicate attention, and being in a brown study, nearly went overboard, like the White Knight.

At this farm we stayed from July 3rd to July 9th. Our proceedings were rather marred by the arrival of a legal functionary, who was deputed by the Sheriff of the district to show us a copy of the law which forbids shooting in the close-season. We had previously got our guide to explain to the authorities that we were not intending to shoot for sport, or even for food, but only to authenticate eggs, and collect a few skins; therefore he desired our proceedings to be benignantly ignored. And if it had not been for a local farmer, who was prevented himself from shooting or snaring Ptarmigan, and did not see why these Englishmen should not be prevented too, we should probably never have been interfered with. As it was, we did not like to carry our guns for some days, which prevented us from bringing to England, thoroughly identified, what we still believe to be the eggs of the Sanderling. (See 'Ibis,' 1886, p. 50.) Harlequin Ducks were very abundant here, and we saw one flock of quite a dozen. They did not seem (from anatomical evidence) to be breeding generally, though we got some eggs. Their food consists of insects, mostly aquatic larvæ of some kind of Ephemera, which they hunt for in the gravelly margins of the rapidest rivers, just such places as anglers

would look for May-fly " Creepers " in. We took our first Scaup's nest here with eight eggs. Later on we got tired of finding Scaups' nests. Longtail Ducks were not uncommon. Of Whimbrels' nests we found plenty. One is noteworthy; it contained only three eggs, much incubated; close beside the nest, which was on a tussock in a marsh, lay, in a small artificial heap, about a table-spoonful of small rounded pebbles, the size of peas, all of which must have been brought from the river, nearly a mile off. Perhaps they were a supply of accessory molars for the young birds when hatched.

Whimbrel rise wild from the nest; or, more probably, slip off the nest unnoticed as soon as you are anywhere near them, and run some distance before taking wing. The very broken nature of the ground, combined with the large number of other Whimbrels about, prevented our seeing them leave the nest, except on two occasions, on both of which we came upon them suddenly round a corner; from one nest C. saw the bird steal a few yards off, and S. walked on to a sitting bird, who flew off.

Redshanks were not uncommon, but we did not take their eggs, if they had laid any.

Snow Buntings were plentiful, and we obtained specimens of the young just able to fly.

There were three Great Northern Divers on the lake. At the special request of the farmer, who has a personal interest in the trout of the lake, we shot the two males, which weighed $10\frac{1}{2}$ and 13 lbs. respectively; whereas two old and two fledgling Ravens weighed together only $11\frac{1}{2}$ lbs., the adult male just 4 lbs. S. will not forget in a hurry walking back to the farm that evening with his fishing-rod over his shoulder in its bag, and a Diver tied to one end and 14 lbs. of trout to the other, and the way they swung about and drove him wild. Nor will either of the travellers forget in a hurry the difficulty they had in skinning the Divers in the Smithy that night till 2 a.m., the exertion required being almost equal to skinning a bullock; smashing the wing-bones with great force and a crowbar; chopping the neck in two at the back of the head with a spade. Two days later the widowed female, whom we spared, had found a new mate.

In addition to those mentioned above, we obtained here eggs

of Teal, Wigeon, Longtailed Duck, Merganser, Great Northern Diver, Snipe, and Merlin. Four young Merlins in down were brought to us, and a couple of goose eggs, and we saw some Goosanders. S. did some fishing for the pot, or rather pan. Trout up to $2\frac{1}{4}$ lbs., redfleshed as Salmon, but much infested with entozoa; they took in preference a small crimson-bodied Grilse fly, with teal wing and golden pheasant tail. The Char, which rose pretty well to fly also, but did not run much over a pound in weight (they are not uncommonly up to 4lbs. in Iceland), preferred big black hackle of grilse size, gold-ribbed.

Our guide rejoined us on July 9th, and we proceeded some twenty-five miles further, over two very boggy and snowy ranges of hills, on which we found Ptarmigan fairly abundant. C. shot a hen bird which had evidently lost its nest through the recent snow, as it had a sitting spot on its breast. The surviving male kept almost within arm's length of him. That evening we found comfortable quarters at a farm by another lake-side, where we stayed several days.

Here we confined ourselves to eggging, and never practised it on so wholesale a plan before. The first day we went out we did not keep a regular account of what we saw, supposing that we could carry the day's finds in our heads, as usual. So on our return to our quarters in the evening we estimated carefully the numbers of the different species of which we had found nests with eggs, viz.: Arctic Tern, 40; Sclavonian Grebe, 14; Merganser, 3; Barrow's Goldeneye, 7; Common Scoter, 1; Scaup, 160; Long-tailed Duck, 30; Wigeon, 2; Red-necked Phalarope, 45; White Wagtail, 1.

There certainly appeared to be a good many birds about. Anything like the number of Red-necked Phalaropes we never saw before. In one spot, where we lay down for awhile at the lake's edge, in the heat of the day, they were running about all round us in the willow bushes and rushes, like mice, and often not more than a yard from us. And on the water they were perhaps more numerous still, and were dotted all over the lake in little parties, arranging their feathers, and playing little tricks on one another. We must have had a hundred individuals in sight at once. They certainly are amongst the most pretty and engaging of birds. One nest—probably a co-operative store—had seven eggs in it.

Scaup Ducks were more abundant there than any other bird; next to them the commonest duck was the Long-tail. We heard their beautiful bugle call all night and all day long.

White Wagtails here perched on the bushes like Whinchats, or perhaps like Ray's Wagtail at home.

Slavonian Grebes were very abundant, and very tame. It is amusing to watch one of these birds swimming under water, as they do when leaving the nest. Their legs, being practically terminal instead of lateral members, give them, under water, somewhat the appearance of large frogs. We took a good number of their eggs, the reason being that there had been a storm of wind recently, and the waves had agitated the floating nests (made of a kind of *Myriophyllum*, and moored to the reeds) to such an extent as to upset many of the eggs into the water, and there they lay at the bottom. We retrieved all we could find; but the endosmosis having been the more vigorous action of the two, many were split.

Falcons and Ravens seemed to be pretty common. Besides seeing both individually, we observed numerous traces of their handiwork in the shape of remains of ducks and sucked eggshells. Some of the ducks seemed to have been killed for amusement and practice; their heads were struck clean off, but no further notice taken of them.

We heard both Great Northern and Red-throated Divers about, and obtained eggs of each.

The next time we went out, over fresh ground, we began to keep a methodical account of all the nests we found with eggs. But after a short time we judged we had had enough of it. It seems almost a work of fiction, but here is the list as far as we got:—Scaup Duck, 305; Long-tail, 12; Scoter, 3; Wild Duck, 3; Merganser, 8; Wigeon, 2; Barrow's Goldeneye, 4; Slavonian Grebe, 4; Phalarope, 13; Snipe, 1; White Wagtail, 1; Titlark, 1; Arctic Tern, 1.

The next day, on a small islet by the lake side, about fifteen yards square, we found twenty-one Arctic Terns' nests with eggs or young, ten Scaup with eggs, four Phalarope, five Grebe. The Arctic Terns haunted, or hunted, the hill sides near here, close to the ground. We did not shoot any, but we believed they were picking up spiders, which were plentiful.

The next morning, July 15th, we went to inspect a Barrow's

Goldeneye nest in a turf wall not far from our quarters. A few days previously we had approached her cautiously, hoping to catch her, as she flew off, in a net softly spread over the hole mouth. These elaborate preparations were wasted. Flying off was the last thing she thought of. She took no notice whatever of the net, and only hissed at us; when an arm was introduced she attacked it, eliciting exclamations from its proprietor of "anything but joy." She was hauled out and examined; we remarked the almost impossibility of distinguishing the females of the two Goldeneyes, and she was then put back into her hole, into which she shuffled, and flopped down on her eggs as if nothing out of the common had happened. She had hatched that day, and we quietly impounded two of her chicks.

We had sent the baggage ponies off early. One being loaded almost entirely with eggs, it was necessary that they should travel leisurely. We followed at mid-day. We picked up, *en route*, young in down of Snipe, Whimbrel, and Redshank. We came suddenly, also, upon an old Ptarmigan with a numerous brood of young ones. S. was off his pony, and had caught a couple of them in a very few seconds. Not wanting any more, he nevertheless looked for the rest, of which there must have been eight or nine within a few yards of him, but not one could he find. The old bird, who had been feigning lameness or injury at first, vanished too, though she certainly had not flown away.

We travelled vigorously for some days, the ground having got much drier, and better going, collecting a few eggs and catching a few fine Trout here and there on our way, and reached at last Akureyri, the northern capital of Iceland, where we put up at Jensen's Hotel, which we can strongly recommend for kindly treatment, comfort, and moderate charges. Here we had a grand unpacking of our treasures, and were gratified to find that not one egg was broken. In fact, all were eventually unpacked in England without a single casualty. The following is our list of eggs:—

White-tailed Eagle	.	.	1	White Wagtail	.	.	5
Iceland Falcon	.	.	5	Meadow Pipit	.	.	16
Merlin	.	.	6	Snow Bunting	.	.	17
Redwing	.	.	5	Mealy Redpole	.	.	15
Wheatear	.	.	1	Raven	.	.	3

Ptarmigan	29	Scoter	20
Golden Plover	38	Merganser	27
Ring Plover	5	Gannet	2
Turnstone	4	Arctic Tern	54
Phalarope	65	Kittiwake	1
Purple Sandpiper	6	Great Skua	1
Dunlin	7	Richardson's Skua	2
Sanderling (?)	4	Fulmar	7
Snipe	7	Little Auk	2
Whimbrel	42	Black Guillemot	6
Whooper	2	Common Guillemot	12
Goose (sp.)	2	Brünnich's Guillemot (?)	1
Teal	5	Razorbill	4
Wild Duck	8	Great Northern Diver	5
Wigeon	20	Red-throated Diver	4
Scaup	19	Slavonian Grebe	50
Barrow's Goldeneye	41	Gadwall	3
Harlequin	5	Ducks (eggs with down brought in by collectors)	70
Long-tail	21		

Some of these, of course, we did not want, but they were brought in by our collectors. Some few were bought at Akureyri, from Herra Hensen, the apothek, or chemist, who had a Rook's skin, killed in the Faeroes, which he thought very valuable, and wondered that we did not care to buy it.

The Gadwall's eggs have only once previously been taken in Iceland. The Ducks' eggs, the last item in the above list, have mostly been determined by careful comparison.

Before leaving Akureyri, S. called upon the Sheriff to satisfy the requirements of the law, by being fined for shooting in the close season. As S. was not very proficient in Icelandic, nor the Sheriff in English, the conversation was carried on in French. "You know you have been breaking the law," quoth the Sheriff. "I am very sorry, but we must have specimens of your birds in all plumages," said S.; "there is a difference of opinion about the species of the Ptarmigan." "I am afraid I must fine you nevertheless; a formal complaint has been made to me, and the law states that 50 öre is the penalty for each bird killed in the close season. Now, I suppose you have killed six birds altogether, haven't you?" continued the Sheriff, who evidently sympathised with the defendant. "Why, yes," said S., managing to keep his countenance, "I should think we must have killed

quite that number." "Then that settles it; three kroner, please," which were at once paid. "Now that this business is over, let me offer you a *petit verre*," the Sheriff concluded, "and we will go in and see the ladies."

They manage these matters infinitely better than we do. No frowning documents to make your soul ooze out of the tips of your fingers; no confinement in cells, or docks, or other indignities before a jeering mob.

We experienced at Akureyri another new sensation, the memory of which will cling to us as long as life does. Every visitor to Akureyri, whose experiences are printed, has mentioned it, and we cannot forbear to do the same. The sensation in question was the smell of the shark-liver oil factory at Oddeyri. Imagine the odour of a dissecting room at its worst, and combine with it the effluvium from a third-rate fish shop at midsummer; the result will be gales of Araby the Blest compared with the perfume of the Oddeyri factory!

It will be observed that we have omitted to state localities throughout; the omission is intentional, lest collectors less scrupulous than we were should be tempted to more reckless destruction of bird life than we were guilty of.

In conclusion we must mention with gratitude the great kindness we experienced in Iceland from all but one person. Especially, too, must we commend our guide, Herra Stephen Stephenson, of Akureyri, whom we found most energetic and obliging. He is a government official and a gentleman, but is glad to increase his income by such aid as we required. We can confidently recommend him as an excellent guide and a pleasant companion.

NOTES ON THE VERTEBRATE ANIMALS OF LEICESTERSHIRE.

BY MONTAGU BROWNE, F.Z.S.

Curator, Town Museum, Leicester.

(Continued from p. 24).

Order STRIGES.—Family STRIGIDÆ.

Strix flammea, Linn. Barn Owl, White Owl.—Resident and generally distributed. This bird has more than once visited

the portico of the Museum at night. Twice I have found its chalky excreta splashed on the steps, and once I found a pellet containing the skull of a Sparrow. In the spring of 1885, I found that it frequented Aylestone Church. In conversation with my friend the late Mr. Widdowson, he told me of an extraordinary parasite he constantly found during the winter months in the legs of this bird, and I asked him to send me the next specimen, which he did on January 7th, 1884, writing, "If you take the skin off the legs, you will find what I take to be the nidus of some insect, and I believe you would find the same in one-half the number killed at this season of the year, but at no other time, and in no other species." On examination, I found, on the tibia just above the joint, under the skin, in the sub-cutaneous tissues, a collection of minute seed-like objects, which, under the 1-inch objective, resolved themselves into thousands of whitish yellow acari. Under a higher power, I made out their possession of eight semi-spinous jointed legs, around an oval, sub-hyaline body, but I could not (even under the $\frac{1}{4}$ -inch, our highest power) make out anything else but one or two short transverse lines and a slit nearly in the centre of the body. From the drawing I made of one of them, I infer their relation to the itch insect.

Family ASIONIDÆ.

Asio otus, Linn. Long-eared Owl (Horned Owl). — Resident, but rarer than the Short-eared Owl, and breeding occasionally. It is included by Potter amongst the birds of Charnwood Forest. It makes no nest of its own, but takes possession of the deserted nest of a Magpie or Crow. Mr. Macaulay presented one to the Museum which had been caught in a rat trap at Saddington Reservoir, October 26th, 1882. I received one from Gopsall in 1880, and another—a female—with well-developed eggs, from Elkington, shot in the district, on March 24th, 1884. I also received a male from Widdowson, shot at Melton on April 30th, 1885. On May 18th, 1882, I went over to Ashlands to see four young ones, taken from the deserted nest of a Carrion Crow on the 13th. The birds were feeding well, and were very pretty, being covered with greyish white down, freckled with dusker markings, and with distinct ear-tufts about half-an-inch in length, also grey, and barred; their irides were

pale yellow. Two still survive. Mr. Davenport, who took them, described the ears of the old bird as "standing up above the nest like the ears of a fox."

Asio brachyotus, Forster. Short-eared Owl (Woodcock Owl).—A winter migrant, generally distributed, but not common. Potter, in his 'History of Charnwood Forest,' mentions it as occurring "in the wilder parts of the moors, and in turnip fields;" and Ingram writes, "occurs amongst gorse bushes and low shrubs, generally two or three together." Widdowson, from whom I received several specimens, considered them fairly common near Melton. One procured at Leicester Abbey on September 20th, 1882, by Mr. Warner's keeper, was presented to the Museum.

Syrnium aluco, Linn. Tawny Owl (Wood Owl, Brown Owl).—Resident, but not very common. I received two nestlings (a male and female by dissection) taken at Bradgate, May 15th, 1885, and an adult pair procured at Newtown Linford, on December 19th, 1885. The gizzard of the male contained the beak of a Sparrow or Greenfinch, a few feathers and bones, and a quantity of fur of mice, including a lower jaw of the Red Bank-Vole. The gizzard of the female contained a little fur and some remains of the Red Bank-Vole, a quantity of feathers, and two beaks of sparrows.

Order ACCIPITRES.—Family FALCONIDÆ.

Circus æruginosus, Linn. Marsh Harrier.—In Potter's 'History of Charnwood Forest' it is stated that one was killed and another seen at Buddon Wood, in 1841, by the keeper to Mr. Butler Danvers. Harley says, "The late Mr. Adams told me that he used to take it in his traps frequently before 1811, when Charnwood Forest was unenclosed, and the species used to be met with more recently about the wild gorse-land lying above Whitwick, called the 'waste,' from whence I have seen specimens brought."

Circus cyaneus, Linn. Hen Harrier (Blue Hawk).—Potter records one as seen at Thringstone in 1841, and Harley states, on the authority of Adams the keeper, that it used to nest in Charnwood Forest regularly before the enclosure, as also in other parts of the county. He adds that, "some years ago I winged a partridge in barley stubble, and, on the dog attempting to

retrieve it, the 'Blue Hawk' carried it away, notwithstanding the discharge of the gun and the shouts of the bystanders."

Buteo vulgaris, Leach. Buzzard.—According to Potter, "two were shot near Charnwood Heath in 1839, one of which came into the possession of Thomas Gisborne, Esq., the other of Kirkby Fenton, Esq." At the commencement of the present century, says Harley, "it used to nest in some lofty firs (from whence he took its eggs) in the lower parts of the Outwoods, Loughborough, near to the brook. It used also to nest at Bardon, Belvoir, Donnington, Gopsall, Martenshaw, and at Oakley and Piper Woods." One was killed in Dalby Wood in 1879, so the late Mr. Widdowson informed me.

Archibuteo lagopus, Gmelin. Rough-legged Buzzard.—A winter visitant. In the autumn of the year 1839, and winter of 1839-40, no less than thirty were procured in this county and in Nottinghamshire. Of these, five were captured in the Forest of Charnwood, and three others in Bradgate Park. One of these, a female, shot on November 12th, 1839, was examined. Its weight was 2 lbs. 4 oz., 23 inches in length, and 54 inches spread of wings. In its crop were found rabbits' fur, pieces of flesh, small bones, and the feet of a field-mouse. In the stomach was rabbits' fur and small bones, mixed with animal matter. A male, captured in the grounds at Bradgate two days afterwards, was found, on examination, to contain some elytra of beetles. One was killed near Ashby-de-la-Zouch, February, 1880. One sent from Bradgate Park, November 15th, 1839, is now in the Leicester Museum. A pair in the Bickley Collection, Leicester Museum, was killed at Stathern Hills, so Widdowson stated.

Aquila chrysaëtus, Linn. Golden Eagle.—No reliable record of the appearance of this bird in the county exists, although Potter, in his 'History of Charnwood Forest,' records a specimen "killed in Bradgate Park, in April, 1841, and in the possession of the Earl of Stamford, at Dunham Massey." This, however, proved to be a White-tailed Eagle, as noted by Harley.

Haliaëtus albicilla, Linn. White-tailed Eagle.—Potter, in his 'History of Charnwood Forest,' states that a specimen was killed at Swannington by Mr. William Burton, the head and wings of which were preserved, and these he saw. Harley mentions one captured in Bradgate Park on 26th of December, 1840, which he shortly after examined. It measured 87 inches

in stretch of wings, and 37 inches in length. The wings and tail were much abraded, suggesting recent captivity; but, on applying to Yarrell for his opinion, he replied that such marks were not unusual. The "Golden Eagle" included in Mr. Babington's 'List of Birds,' printed in Potter's work on the Forest of Charnwood, was wrongly identified, and proved to be an immature White-tailed Eagle. The specimen in question is in the possession of Lord Stamford. Widdowson reports one taken at Stapleford Park. In the 'Midland Naturalist' for March, 1882 (p. 62), Mr. Macaulay mentions one he saw, which was shot by Sir G. Beaumont's keeper at Coleorton, in Nov., 1879. It was seen some days before it was killed feeding on a rabbit. He adds that in the autumn of 1881 Sir G. Beaumont saw an Eagle soaring over his grounds, but at too great a distance to distinguish the species.

Astur palumbarius (Linn.). Goshawk.—Harley says:—"The Goshawk must be regarded as exceedingly rare. I have known it trapped and shot at Oakley and Gopsall Woods, and recollect seeing one many years ago which had been shot at Oakley Wood by a gamekeeper named Monk." In the 'Midland Naturalist,' 1882, p. 62, Macaulay writes, "One was seen in Allexton Wood in 1881"; but his informant, Mr. Davenport, replying to my enquiries, stated that, so far as he could recollect, the taxidermist at Billesdon (Potter by name) had in his shop for six or seven years (if not more) a bird shot by a Mr. Brewster (who once lived at Allexton Hall), at Allexton; this bird was said to be a Goshawk. Mr. Potter, on being written to, confirmed this.

Accipiter nisus (Linn.). Sparrowhawk. — Resident and generally distributed. Breeding so close to the town of Leicester as Knighton, where I have found the nest and eggs. I purchased, from Elkington, an adult male, shot near Ansty, December 12th, 1885, whilst attempting to strike the decoy Linnet of a birdcatcher. Mr. Davenport, who found a Sparrowhawk nesting in Skeffington Wood in March, 1884, wrote word that "she laid her first egg on April 30th, and continued laying in the same nest, by fits and starts, until the first week in June. He took fourteen eggs in all from this nest! This bird laid forty-five eggs in five years: fourteen in 1879, four in 1880, nine in 1881, four in 1882 (in 1883 I was in Cornwall), and fourteen in 1884.

All the forty-five eggs were very similar, and the five nests were all within a radius of a hundred yards. In 1885 she disappeared; but at Keythorpe, from a nest in a fir-plantation, I took fifteen eggs consecutively. After the fifteenth egg I molested the bird no more. For three consecutive years she adapted an old pigeon's nest to her use in one of the trees."

Milvus iclinus, Savigny. Kite.—Potter, in his 'History of Charnwood Forest,' says that "one was shot from a window at Longcliff in the act of watching some young pigeons"; and Harley remarks that when a boy it was no unusual sight to observe a Kite passing overhead to the forest of Charnwood, and its bleak lone hills. It used to frequent some of the more retired woods, as, for example, Groby, Martenshaw, and those of the northern division of the county. It occurred at Belvoir Wood in the autumn of 1850, but there remains at the present day no trace of it, except in the name "Kite Hill," a former haunt. Widdowson had received three or four during the last twenty-five years.

Pernis apivorus (Linn.). Honey Buzzard.—A rare summer visitant. An immature example was shot by a keeper at Martenshaw Wood on Oct. 28th, 1841. It was flushed from the ground, where it was feeding on the larvæ of the common wasp. Its cry, on being surprised, resembled that emitted by the Barn Owl. A second example was shot shortly afterwards in Lea Wood, near Ulverscroft, and, for want of a little knowledge of its rarity and value, was consigned to the ferrets. I examined a dark specimen in the possession of the late Mr. Widdowson, which was procured near Twyford Mill in September, 1881, by a Mr. Greasley, who for several mornings had seen it about, and had attempted to shoot it, when, after losing sight of it for two days, he was attracted to the spot, where it lay dead, by a crowd of little birds surrounding it. Apparently it had been killed by flying against the telegraph-wires. Mr. Ingram writes that one was shot by Mr. Lovett near Belvoir. I saw, at Noseley Hall, a specimen in ordinary dark plumage, shot by Sir Arthur Hazlerigg, some years ago. I purchased a female specimen (in the immature brown plumage), shot at Theddingworth on the 18th June, 1879, by Mr. W. Hart, jun. The weight was not taken, the bird being extremely thin. Length, 23 in. Culmen, 1.5 in.; wing, carpus to tip, 16 in.; tarsus (of a dull orange yellow),

2 in.; irides, golden yellow. The crop, gizzard, and intestines were filled with insects, mixed with vegetable fibre, probably grass-roots, one or two blades of grass, and a leaf, no doubt swallowed when tearing out a wild bee's nest. Careful washing produced small bees (*Nomada* sp.?), about one hundred ichneumon flies, some *Syrphidæ*, one soldier beetle (*Telephorus* sp.), and parts of other beetles; one hundred or more larvæ, or parts of larvæ, of *Geometridæ*, of three species, the greater number being probably those of *H. progemmaria*. This specimen is now in the possession of Mr. R. W. Chase, of Edgbaston, Birmingham. The Leicester Museum possesses an immature male specimen (in light snuff-coloured plumage), procured from the late Mr. Widdowson, to whom it was sent alive on being taken at Croxton Park on June 13th or 14th, 1884. Mr. Widdowson wrote concerning it:—"I have examined it, and cannot find any wounds. It is very amiable, allowing me to stroke its head or back without showing any temper or fear. It is now two or three days since capture, and it has not eaten anything at present." After it came into my possession I kept it alive up to the end of June, but, although exceedingly tame, it would not touch anything, nor could we force anything down its throat, not even water. After it died we found it had received injury to the walls of the abdomen, evidently caused by shot. The colour of its irides was golden yellow; legs and toes reddish yellow.

Falco peregrinus, Tunstall. Peregrine Falcon.—Has occurred near the Loughborough outwoods, at Gopsall, at Groby, at Bradgate, in Oakley and Piper Woods, and at Stapleford Park. Turner reports a female, shot by Mr. Berkeley at the North Bridge some years since, while chasing pigeons. In October, 1885, I purchased a specimen for the Museum, an immature female said to have been shot some eight years previously at Woodgate, near the North Bridge, out of some high poplar trees; and in May, 1885, Mr. Owen West presented to the Leicester Museum an old female Peregrine, shot by himself at Tur Langton, about five years previously.

Falco subbuteo, Linn. Hobby.—An uncommon summer visitant, and has bred in the county. Potter records one specimen as having occurred near Thringstone. According to Harley, "It usually breeds in the deserted nest of a Carrion Crow or Magpie,

which it repairs. In the summer of 1840 a pair of Hobbies took up their abode in the deserted nest of a Magpie on a large elm, standing in a hedgerow within the lordship of Houghton. Some of the young birds were taken from the nest and made pets of by a neighbouring gentleman, who kept them for some time. Chaplin, of Groby, in the month of September, 1841, met with this species in Martenshaw Wood. The parent birds were destroyed, and the young ones taken away." In addition to the localities named the Hobby has been met with at Coleorton, in 1874; at Gumley Wood, on several occasions; at Rothley, in March, 1880; and at Stockerston Wood, where two were shot in the summer of 1881. One was chasing the other, and both were killed by one discharge, and hung on a tree with other vermin. Some years ago I purchased a male, killed at Hinckley, and another at Sir Beaumont Dixie's sale in September last, which was shot at Bosworth Park. Both are now in the Leicester Museum. The late Mr. Widdowson reported three during 1880, and wrote that it had bred at Burleigh Park, Oakham, since 1880. Elkington has received several within the past twenty years, reporting one, a male, caught by nets in 1882.

Falco aesalon, Tunstall. Merlin. — An uncommon winter visitant. According to Potter it has occurred near Sheepshed, and Harley states that it comes to our woodlands in autumn, remaining during the winter months only. Mr. J. B. Ellis presented to the Museum, on Jan. 30th, 1882, an adult female Merlin in the flesh, shot at Bardon Hill, and has informed me of two others since then, one of which was shot. Ingram writes, "Taken occasionally at Belvoir." Widdowson reports several during the last few years. Elkington received a female shot at Dunton Bassett on Dec. 11th, 1885.

Tinnunculus vespertinus (Linn.). Red-footed Falcon.—The MS. Donation Book, Leicester Town Museum, records the presentation, by the Literary and Philosophical Society, on Feb. 22nd, 1866, of an "Orange-legged Hobby, shot near the Machine House, Belgrave Road, July 1st, 1865," with a note in the margin, "first recorded specimen in this county." It is still in the Museum, but, from certain facts which have come to my knowledge, I doubt its authenticity.

Tinnunculus alaudarius (Gmelin). Kestrel. — Resident and commonly distributed. Macaulay considers that since the

passing of the Wild Birds Protection Act this species has become commoner, which tallies with my own observation. In the stomachs of Kestrels I have dissected I have never found anything but remains of beetles and mice. Davenport writes:—"My experience of Kestrels is that they are more sensitive than the Sparrowhawk, forsaking their nest if tampered with. If I find a nest with three eggs, I take one only, or it is almost a certainty the bird will not only forsake, but will cast away the remaining eggs as well. I found a white egg at Billesdon Coplow in May, 1882." Mr. Johnson, keeper at Laughton Lodge, Rugby, sent me, in May, 1885, an old Carrion Crow's nest, in which a Kestrel had laid five eggs, light-coloured and very handsome. I weighed two of them when quite fresh; one was a little more than $\frac{3}{4}$ oz., the other exactly $\frac{3}{4}$ oz.

Pandion haliaëtus (Linn.). Osprey. — A rare visitant. According to Potter, "One shot by the Marquis of Hastings at Donnington Park, October, 1841, is now in his lordship's collection. Harley says one was shot in Sileby field in 1840, while sitting on the shafts of an agricultural roller. A fourth example was obtained by Mr. Adams at Groby Pool; and in 1841, during the autumnal months, Sir Oswald Mosley recorded the capture of a fifth at Overseal. The late Mr. R. Widdowson informed me of one killed some years ago, of which he had forgotten the particulars, and of another, a male, shot by Mr. George Hack, at Edmondthorpe, on Nov. 13th, 1858, which was 5 ft. 4 in. in spread of wing. In the 'Midland Naturalist' for March, 1882, p. 62, one shot some years since at Noseley is stated to be in the possession of Sir A. Hazlerigg. I received one, shot at the Reservoir, Bradgate Park, on Sept. 18th, 1879, by Mr. C. Overton, keeper to Lord Stamford. It was a fine female specimen: weight, 4 lbs. 2 oz.; extreme length, 23 in.; spread of wings, 5 ft. 4 in.; tail, 9 in.; carpus, to tip of third primary, 18 in.; culmen, 1·5 in.; tibia, 5 in.; tarsus, 2·5 in.; middle toe with claw, 2·5 in. Mr. Overton, who had several opportunities of observing it feed, saw it take several fish with hardly a miss. This specimen was mounted for the late Earl of Stamford and Warrington, and is, I believe, now at Enville.

(To be continued.)

ORNITHOLOGICAL NOTES FROM NORTH NORFOLK.

BY J. H. GURNEY, JUN.

THE ornithological events which happened in the northern part of the county of Norfolk, during the year 1885, were neither numerous nor important; but of such as came under my notice the following are selected as the only ones of especial interest. The autumnal migration, which in 1884 added three new species of birds to the Norfolk list, in 1885 did nothing for us, so far as Blakenney and Cley are concerned, where the Messrs. Power kept their usual sharp look-out for nearly a month, and where I joined them several times in fruitless search; but to a student of migration the absence of species is perhaps as suggestive as their occurrence, inasmuch as it may help to an understanding of what brings accidental visitants to our coast, if coupled with daily notes of the direction and velocity of the wind.

Bearded Titmouse, *Calamophilus biarmicus*.—The tongue and inside of palate in a nest full of young Bearded Tits, examined at Potter Heigham not long ago, presented a most singular and really very pretty appearance. It consisted of rows of black and white dots, regular and raised, upon a red ground. I should like to know if this has ever been noticed. In another nest, found the same day, which contained eggs, the male was sitting upon them, as was plainly visible to myself and two other ornithologists. Mr. J. Young has observed this same habit in confinement (*cf.* Norf. & Norw. Trans. iii. p. 521).

Great Grey Shrike, *Lanius excubitor*.—A Grey Shrike was shot at Beeston Regis, on March 23rd, as it was eating a Hedge Sparrow; it was close to a house, and was either very tame or very hungry, for it allowed itself to be approached within two yards.

Black-bellied Dipper, *Cinclus melanogaster*.—On September 2nd and again on the 5th a Dipper was seen at Cley. I do not recollect that one has been recorded in Norfolk as early as August before, November being the month in which they have generally occurred.

Blue-throated Warbler, *Erithacus suecica*.—The Blue-throats, which were so abundant last year (Norw. Nat. Tr. iv. 40), evidently passed our coast without stopping. The only one was

shot on Horsey sand-hills, by Mr. G. Hunt, on September 25th. From September 8th to September 11th we had the wind N. or N.N.W.; after that we had a good deal of S. and S.W. wind until the 20th, when it got into the N.W. again and remained so.

Goldfinch, *Carduelis elegans*.—About twenty Goldfinches were observed on an alder at Hempstead, Dec. 5th; and thirty or forty more, too far off to be identified with certainty, are believed to have been seen. It is commoner with us than it used to be.

Mealy Redpoll, *Linota linaria*.—On October 18th a Redpoll, which is apparently a Mealy Redpoll, settled on board the 'Leman and Ower' light-vessel and died, no doubt from exhaustion. Wind N.N.E.

Tree Pipit, *Anthus arboreus*.—On November 10th—a late date—a Tree Pipit killed itself on the 'Leman and Ower' light-vessel. Wind S.E.

Wood Sandpiper, *Totanus glareola*.—On August 12th a Wood Sandpiper and two Green Sandpipers were shot at Hempstead.

Black-tailed Godwit, *Limosa melanura*.—On September 15th a Black-tailed Godwit was shot at Blakeney.

Long-tailed Duck, *Anas glacialis*.—An adult male in *full breeding plumage* was caught by some boys in a dyke on Acle Marshes, about June 14th. This is the second time it has occurred in Norfolk in this plumage; the other specimen was shot in the same district several years ago. Its occurrence in winter is of course much less remarkable.

Scoter, *Ædemia nigra*.—On July 22nd some Scoters were observed at Cromer. Their occurrence in summer is not very unusual.

Eider Duck, *Somateria mollissima*.—On August 5th I saw a large bird swimming in the surf at Cley, which was apparently an Eider Duck. It had been seen at the same place every day for a fortnight, but (of course) took its departure on the very morning I went off to shoot it. On December 30th I was told a pair were seen, and the female shot. Old males are extremely rare on this coast, but females are not uncommon.

Pink-footed Goose, *Anser brachyrhynchus*.—Two Pink-footed Geese were shot at Blakeney on December 30th. I never positively identified this species of Goose there before, but Major Feilden tells me they are often taken in nets at Wells, and last

year two were caught at sea off Cromer, having very likely been wounded; and, being turned out on a private pond, lived very happily until they escaped.

NOTES AND OBSERVATIONS ON BRITISH STALK-EYED CRUSTACEA.

BY EDWARD LOVETT.

(Continued from vol. ix., p. 469.)

Crangon fasciatus.

THIS and the five following species of the genus *Crangon* are so comparatively rare and so easily mistaken, when seen casually, for the young of the common Shrimp, that there is but little to record of their habits and life history. My own series of the genus is but small, so that I refer for a brief description to Bell's standard work. Of this series he says it "considerably resembles the common shrimp in its general aspect; but, besides being very much smaller, it differs from it in many particulars. The peduncle of the internal antennæ is proportionally much shorter; the spines on the branchial region of the carapace obsolete. The first pair of feet are robust, the movable finger much curved; the second pair of feet shorter than the first, and the third extremely small, minutely didactyle; the third pair very slender. The abdomen is as large as the thorax for rather more than half its length, and then contracts somewhat suddenly, by which it may be at once distinguished from young individuals of the other species. There is also a remarkable brown band across the fourth segment of the abdomen, and a spot or two of the same colour on the sides."

"Total length six-tenths of an inch."

It was evidently a rarity to Bell, who records that he found three specimens among some small Crustacea sent him from Salcombe Bay, Devonshire. Since then, however, it has been recorded from several localities, namely, the Farne Islands, in 1863; the Shetland Islands in 1868; Galway, Arran, where it is recorded as rare; Belfast; the Northumberland coast; Cornwall, where it is said to be found occasionally on stony ground; Dublin, Sandy Cove, where it is recorded as spawning in May; and it is also recorded from the Adriatic Sea.

It has been surmised that this species and *Crangon sculptus* are identical with *C. boreas* of Phipps, and, from my experience, I should say that not only was this possible but that many of these smaller forms might actually represent a less number of species than they do at present. They do not occur in sufficient numbers, nor with sufficiently marked characteristics of habitat, &c., to be regarded as good species; for differences of locality, time of year, and other circumstances, often result in features of a more or less varied type. I have known differences of opinion to exist regarding the identity of larger species than these, and I think it more than possible that the genus *Crangon* does not embrace so many species in reality as we at present credit it with.

Crangon Pattersonii.

A species under this name has been recorded in the 'Natural History Review' as having been found at Belfast.

Crangon spinosus.

This species differs from the preceding ones chiefly in having five rows of spines on the thorax, pointed forwards; in other respects it much resembles other Crangons. Bell regards it as rare, but of rather wide distribution; but also states that Leach speaks only of two specimens, one from Plymouth and the other from Falmouth. He also records it from Shetland and Ireland.

It is elsewhere recorded: from Shetland as common; Galway as rare; Belfast, Northumberland, and Durham coasts; South Devon, frequent. It has been also specially recorded from off Tynemouth and Berwick, at which latter place a specimen $2\frac{1}{4}$ inches in length is said to have been taken; this is certainly large. It is also said to have been taken in the Adriatic Sea.

Crangon sculptus.

This species is described as differing from the preceding one "in the less regularly longitudinal direction of the lateral raised lines on the carapace, the less pointed and fewer teeth of this part, the longer proportion of the antennæ-scale with relation to the peduncle, and, strikingly, in the sculpture of the abdominal segments, and the extent and sharpness of the carina

on this part." Bell, however, states that he had only two specimens. It is also said to have occurred at Dublin, Galway, Belfast, the Hebrides, South Devon, and the Adriatic Sea.

Crangon trispinosus.

Bell describes this species from Mr. Hailstone's description, admitting that he himself had never seen a specimen. Its characteristic features are there stated to be three spines only on the thorax, one in the middle and one on each side of it; the colour being less clouded than that of the common shrimp, and with a sprinkling of golden blots. They were called by the men who caught them "pug shrimps."

This species is elsewhere recorded from Shetland, Holy Island Harbour, Dublin, and South Devon.

Crangon bispinosus.

Bell's description of this species seems to be a somewhat hesitating one, as it is a description by Mr. Hailstone of a single specimen which was found at Hastings in a heap of *Filipora filigrana*. It is stated to have some points of resemblance to *C. sculptus*, except as regards size, which, however, does not count for anything, considering only one specimen was then seen. It, however, has a slightly different arrangement of spines on the thorax, having two prominent ones and a row of blunt notches; this would appear to be its specific feature, if it be indeed a permanent one. There have been, however, several records of a species under this name since, so the form, whether a species or variety, has been more established.

Amongst the localities from which it is recorded are Shetland (where the record states "locally common"), Galway, Isle of Arran (rare), Durham and Northumberland coasts, and the Hebrides. Two specimens of this "rare species" are also stated to have been dredged in forty fathoms, forty to fifty miles off Tynemouth. *C. bispinosus* is said to be *C. nanus* of Kröyer.

Crangon serratus.

A species under this name has been described, and also recorded, from the Shetlands and Hebrides.

In these short notes on the genus *Crangon* I have, I fear, expressed myself somewhat sceptically as to the number of

species recognised, described and recorded. This I may have no right to do, but, considering the paucity of the specimens (in some cases only one) from which species have been evolved, and considering also the remarkable effects, on variation of colour, size, markings, and even shape, produced by locality, climate, geological and zoological influences, even amongst larger and more defined forms than these, I am inclined to recognise the full claim of such important and powerful causes in producing varieties. I hope, on the conclusion of these chapters, to say a few words on such varieties among the stalk-eyed Crustacea, in which I shall refer to some of these points. Of course, with regard to the genus Crangon, I have, as already stated, very few species, or even specimens of the rarer ones, but from all records this seems to be a somewhat general feature. Most of my other genera are represented by large series of each species, and in one case where three species of one genus are described by early authors from the British seas, I have so many intermediate varieties that it is really hard to say where one species leaves off and the next commences.

I find the proper method to adopt in regard to a critical or obscure species is to procure (when possible) specimens of various ages, and therefore moultings, and sizes; some changes do most certainly take place during moultings, even after the animal has reached the final stage of its existence.

With but one or two exceptions, the several species of the above genus are described as being very much smaller than the common Shrimp, and I have myself noticed that not only does the common Shrimp vary considerably in different localities, but that it is among the immature specimens that this is most noticeable.

Alpheus ruber.

This beautiful and exceedingly rare Crustacean has lately been discovered at its proper home in one of the Channel Islands by an indefatigable naturalist, Mr. J. Sinel, of Jersey, from whom I have received two of the finest specimens ever seen as regards colour, condition, and size. I am also indebted to Mr. Sinel for some valuable notes on its power of producing sound, as well as on its habits so far as he has been able to observe them.

In describing this species as *Alpheus ruber*, I may be considered in error by those who have examined specimens of this

rare genus from the Mediterranean or elsewhere. I believe that two species have been described as British, namely *A. ruber* and *A. affinis* or *megacheles*, but, for want of opportunity to compare such specimens as have from time to time been found, I am unable to express an opinion on their distinctive features.

As three specimens in my possession do not differ materially from each other, or from Bell's figure and description of *Alpheus ruber*, I am content to consider them of this species.

With a rare form like this it is difficult to form a decided opinion when so few collections of Crustacea contain any representative of this genus; when the literature of the subject contains perhaps fewer references; and when such records as do exist are not collected in one book, but scattered through such publications as 'The Annals and Magazine of Natural History,' the Reports of the British Association, the 'Natural History Review,' and the various Reports of Scientific and Natural History Societies.

As I have said, the only species of the genus described by Bell is *Alpheus ruber*. He says that the genus is chiefly confined to hot climates, one species only having been found in Britain, and gives the generic characters as follows:—External antennæ placed beneath, and to the outer side of the inner; the lamellar palp of moderate size, somewhat slender and pointed. Internal antennæ terminating in two filaments, of which the superior is rather thicker than the inferior; the basal articulation short, and furnished with a spiniform scale. External pedipalps more or less slender and elongated; terminal joint broad, and somewhat foliaceous. First pair of legs didactyle, robust; one much larger than the other, and very differently formed; second pair also didactyle, very slender; the carpus multiarticulate; the remaining pairs slender, monodactyle. Carapace extending forwards so as to form an arched covering to the eyes. Rostrum small or wanting. Abdomen long and much developed.

His description of the species is from two specimens obtained by Mr. Cocks, of Falmouth, who procured them from the stomachs of codfish, which resulted consequently in their being much damaged. He described the arm as being about three times as long as it is broad, and as having a small spine situated about one-third from the extremity, the wrist being

short. The larger hand, which is on the left side, is short, the sides nearly parallel, flattened, the upper margin with two carinæ; the outer side also with two carinæ, the inner surface rounded.

These being the chief specific characters as alluded to, I will compare them with those of my own specimens. In the two just received from the Channel Islands the spine on the arm, referred to above, is wanting; but the angle of the arm nearest the wrist is in the form of a spine, and from it the margin of the arm slopes down to the point at which the wrist is articulated. The third and smaller specimen, which, I believe, came from the same locality, is unlike them in this feature, nor is it like the figure in Bell's work. It has a spine-like process situated as in the figure referred to, but instead of the edge of the arm being continued on the same plane beyond it, it slopes down to the joint, as in the case of the other two specimens, but at a greater angle. Thus Bell's figure, my small specimen, and my two large specimens, illustrate the development of a spine into a marginal tooth, the stages possibly indicating different ages. I do not say this is so, but it is reasonable to infer it.

Again Bell says that the left hand is the larger, but in one of my two new specimens the right hand is the larger, and as the structure of the hands is so very different, this is an important feature, as it shows that it cannot be relied on to determine a species.

The larger hand is very massive, rounded, and smooth, except towards the fingers, where it is armed with rather long, pale coloured hairs on the inner surface. On the outer edge of the large claw there is a rib-like projection terminating forward in a spine, just above the fixed finger. This is not the case with the small hand. The movable finger of the large hand is very much hooked, and shuts over the curious fixed finger like the beak of a Crossbill. The fingers on the small hand are much straighter, larger in proportion to the size of the hand, though they too cross like those on the large hand, but to a less extent. In my specimens also the rostrum is very small and simple, the eyes protected by arched continuations of the carapace, which becomes transparent, as if to permit the animal to see through it, whilst it affords a screen to its organs of vision. The tail plates are large and beautifully fringed with setæ, and the central plate is armed with four spines pointing downwards.

We now come to the most interesting point in the structure of this or perhaps any other Crustacean. The last segment of the abdomen, not counting the tail segment, is armed on either side with two spines of a curved, triangular form, which are articulated into the lower part of the side of the segment, but deflected from it at such an angle as to allow them to overlap and rest on the two movable flanges of the tail. It is known that this animal possesses the power of producing sound in the form of a sharp click, and, although I have never had the good fortune to observe it in a living state, I am convinced that this sound is no doubt produced by bringing the tail plates sharply over these spines. In fact, I produced a sound, similar to what I imagine to be the correct one, by "clicking" a pin over the spines of my dead specimens. Mr. Sinel, of Jersey, informs me that he had these specimens alive for some time in a glass jar of sea-water, and was astonished at the loudness of the sound produced, even in some depth of water. He tells me it was as loud as that produced by striking the palm of the left hand with three fingers of the right hand, and so sharp that it seemed as though the glass of the jar were flying in cracks, as glass does on sudden changes of temperature. It would be very interesting to know the advantages derived from this sound-producing power by the animal itself, whether it be in some way a sexual guide, or whether it acts as a terror to its enemies, or a means of giving notice of approaching danger. Any observations on these points from those fortunate enough to obtain living specimens would be of great value.

The colour of my specimens is a bright sealing-wax red, shaded off to a delicate rose tint on the thorax; the large claws are shaded with purple, and the legs and tail plates are pale salmon-colour.

Mr. Sinel informs me that the bright red is the living colour, but that the female is inclined to a browner hue; he noticed, however, that when in a glass jar, and undisturbed, the colours generally assumed a transparent brownish tint, but immediately became scarlet again when the animals were alarmed or irritated. *Alpheus ruber* is with spawn in February, and Mr. Sinel has just succeeded (March) in hatching out the zoæ.

(To be continued.)

NOTE.—I shall be happy to correspond with any naturalists living near the shore with a view to obtaining information regarding any Crustacea that may come under their notice. I shall also be glad to exchange specimens, and to assist, in any way in my power, any one who wishes to work at this interesting group, and give information as to the best mode of obtaining, preserving, and identifying specimens. — E. LOVETT (West Burton House Outram Road, Croydon).

NOTES AND QUERIES.

The late Charles William Peach.—We extract from the 'Scotsman' the following biographical notice of a very remarkable man. Charles William Peach died on the 28th of February, at his residence in Haddington Place, Leith Walk. He was born in the year 1800 at Wansford, in Northamptonshire, where he lived till early manhood. His birth-place being on the outskirts of the Bedford Purlieus, one of the great English forests, he became passionately addicted to field sports, and there can be no doubt that the keen observation developed in the pursuit of sport stood him in good stead when in after years his mind was directed to the more noble pursuit of Science. Having joined the Coastguard service while still a young man, he was stationed at various places on the east and south coasts of England. Those were the palmy days of smuggling, and Mr. Peach, who was always an indefatigable officer, had many hand-to-hand encounters with some of the most desperate characters engaged in the lawless traffic. It was while stationed at Cromer, in Norfolk, where the sea has long been known to be eating the land by washing down the clayey cliffs, thus exposing the remains of Mammalia, that his attention was first attracted to the objects cast up on the beach. The living marine animals and Algæ, on the one hand, led him to study Marine Zoology and Algology; while, on the other hand, the remains of the dead animals naturally aroused him to the study of Palæontology, to all which branches of Science he afterwards made many valuable contributions. These studies brought him into contact with other workers in the same fields, many of whom are the highest authorities in their several departments—in Zoology, Darwin, Milne-Edwards, Edward Forbes, Allman, Owen, Huxley, Wyville, Thompson, Bowerbank, Alder, Hincks; in Algology, Harvey and Mrs. Greville; in Geology and Palæontology, Buckland, De la Bèche, Murchison, Lyell, Hugh Miller, Nicol, Geikie, all of whom have been more or less indebted to him for direct help in their researches, as reference to their works will fully bear out. Many of his discoveries, especially his earlier ones, were first announced by him before the British Association, his presence at whose meetings will be well remembered by not a few of the

older members. Having been transferred to the Customs, Mr. Peach eventually came to Scotland, being stationed first at Peterhead, and afterwards at Wick. It was while at this latter place that he made the acquaintance of Robert Dick, the Thurso baker and geologist; and the account of their friendship and mutual studies is contained in some of the most interesting chapters in Dr. Smiles's 'Life of Robert Dick,' part of which book is devoted to a biographical sketch of Mr. Peach. It was also while stationed in the north that he made the discoveries at Durness of those fossils which are now our means of determining the geological age of the Highland rocks, as by similar discoveries he had previously obtained the key to the age of great part of the older rocks of Cornwall and Devon. Not only, however, among scientific men had Mr. Peach a large acquaintance, but his genial and sympathetic nature attached to him also to many men of literary pursuits, amongst whom was Lord Tennyson, who was a frequent guest in Mr. Peach's house at Fowey, in Cornwall, and with whom he formed a life-long friendship. Hugh Miller and Robert Chambers were numbered amongst his more intimate Scottish friends.

Zoological Lectures at Oxford.—Among the lectures announced for delivery at Oxford next term by University Professors are a course on "The Mammalia," by Prof. Moseley, and a course on "The Haustellated Orders of Winged Arthropoda," by Prof. Westwood. Mr. W. B. Spencer, one of the Demonstrators of Anatomy, will lecture on Embryology.

MAMMALIA.

Variety of the Squirrel.—A variety of the Squirrel perhaps worth notice was killed last summer in the extensive fir woods near Ringwood. It was remarkable both for size and colour. It was a male and weighed nearly seventeen ounces, or five or six ounces heavier than an ordinary Squirrel. Its colour was a pale brownish grey, resembling that of the common wild Rabbit, but with indications of the normal brown colour on the cheeks, feet, and flanks. The ears were destitute of any decorative tufts, and the tail somewhat scantily furnished, but the longest hairs thereon were white; the condition, however, of both ears and tail is doubtless characteristic of the season. [So also is the colour, Squirrels being much greyer in winter than in summer. If the specimen in question was killed in *early* summer it might not have assumed its nuptial pelage, or if procured in *late* summer or autumn it may have prematurely donned its winter garb.—ED.] It was frequently seen in different parts of the woods before it was killed, and for a time was unmolested; but having been detected in what the gamekeeper considered too close proximity to his Pheasant-coops, he shot it as a suspected depredator. I have been informed that a specimen almost exactly similar in size and colour was killed the previous year in some fir woods a few miles distant.—G. B. CORBIN (Ringwood, Hants).

BIRDS.

The Destruction of Birds for Plumes.—The American Ornithological Society has issued a strongly-worded protest against the wholesale destruction of birds of brilliant plumage for the decoration of ladies' hats. The killing of birds for mercenary purposes has increased of late years in the United States to an almost incredible extent, and already in some species there is a startling decrease in the number of the feathered tribe. Every year orders go north, south, and west for hundreds of thousands of birds to supply "the trade." In fact, unless protection comes soon for many of the more beautiful and prized species, it will come too late. By the statutes of most of the States, the favourite song birds of America are shielded from destruction, and game birds are also protected by law through a greater part of the year. But, so long as the demand for bird-plumage lasts, the supply will continue, even though the price asked for favourite "wings" rises with ominous and alarming rapidity. One thing only will arrest the wanton destruction of the birds, and that is a change of fashion brought about by the concerted action of thoughtful and humane women. The American ornithologists appeal to the ladies of New York to make a pronounced stand on behalf of the birds and against the prevailing barbaric fashions. It is obvious that little good can result from individuals challenging public taste, and therefore women's leagues are to be formed in the United States, with head-quarters at the Museum of Natural History in the Central Park, New York, to bring about, by reason and persuasion, a welcome change of a cruel fashion. In London, through the instrumentality of Mr. G. S. Musgrave, an association has been formed, called "The Selborne Society," having the same object in view as the American society. Mr. Musgrave, whose address is 45, Holland Park, Kensington, W., has issued a pamphlet on the subject, which he will be glad to forward on receipt of a penny stamp, and he wishes those who desire to support the movement to forward their names to him, together with a donation, however small, to aid in defraying the cost of printing and advertising. We trust that his efforts to check the unreasonable destruction of bird-life, which has for a long time been carried on merely to comply with a fashion, may ultimately prove successful.

Migration of Birds on the West Coast of England and Wales.—As the member of the British Association Committee in charge of the above section of the Migration Report, I shall be glad to receive from ornithologists and others, as early as possible, observations on the migratory movements of all species, and on the occurrence of rare or uncommon visitors, within the region (inclusive of inland localities) during the spring and autumn of 1885. When possible, the notes should be accompanied by observations on the direction of the wind, and general state of the weather at the time. By

such assistance it is hoped to make the Report more complete, and all co-operation will be duly acknowledged therein. — WM. EAGLE CLARKE (18, Claremont Road, Headingley, Leeds).

Birds used for Sport in China.—In the December number of 'The Zoologist,' at p. 447, there is an interesting article entitled, "Birds used for Sport in China," wherein it is stated that Snipe, as well as Quail, are flown at with the Sparrowhawk. M. Pichot remarks that "possibly the Snipe of that country is slower and heavier on the wing than ours." Perhaps the Snipe in question may be the Painted Snipe (*Rhynchaea bengalensis*), not an uncommon species in Southern India and China. They lie close, their flight is comparatively heavy and not sustained, and this bird would be readily captured by the Sparrowhawk. — HENRY HADFIELD (Ventnor, Isle of Wight).

Changes of Plumage in the Kestrel.—Mr. Cecil Smith's remarks on the change of plumage in the male Kestrel (p. 110) induce me to send a short notice of a fact observed by me bearing on the question. Some years ago, when I was staying at a friend's house, it was found that a hawk had been making free with some of the tame-bred Pheasants. The game-keepers discovered the nest within twenty yards of the coops, which had been left undisturbed till the young hawks were half-grown, and lay up to shoot the plunderers. About 7.30 next morning I heard a shot fired, and on going down found the keeper with a full-plumaged male bird. A couple of hours afterwards he shot and brought up another bird, which he took for the female (it was killed on the edge of the nest), but on examination I saw at once that it was a young male, in immature (female) plumage, with the exception of a few blue feathers on the upper tail-coverts. We see, then, that a bird at least a year old had only begun to assume adult plumage; that he was then, I suppose, unmated; that though not eligible as a husband, the hen adopted him as a foster-father; that two hours were sufficient for her to find a mate in a country where all vermin had been systematically killed down for years. Again; when do Cuckoos assume adult plumage? I once saw a Cuckoo in Leadenhall Market in May in nestling plumage, except one or two grey feathers in the head.—H. T. FRERE (Burston Rectory, Diss).

Habits of the Arctic Skua as observed in Caithness.—As the Arctic Skua (*Lestris parasiticus*) seems to be rare in England, and its habits not much known there, I will give a short account of the bird, as observed here every season during the breeding-time. It is very well known in Orkney and Shetland, and breeds in many of the islands, as also in the Hebrides. Sir William Jardine met with it in Sutherlandshire in June, but I have not heard of its nest having been actually found in that county. In Caithnesshire it is well known, and is a very abundant species, breeding in

considerable numbers on the wide moors and marshy tracts of the interior of the county. Its head quarters some years ago seemed to be a low and remote piece of moorland of this description in Watten parish, surrounded by thousands of acres of grouse moors and sheep grazings, and studded by numbers of small lochs, containing mossy mounds and islands of varied size and shape. This was a favourite breeding-station of the Arctic Skua. The Lesser Black-backed Gull, the Common Gull, and a good many of the rarer swimming and wading birds also resorted to these pools and the neighbouring swamps for the purpose of nidification. It is to be feared that this interesting colony is now thoroughly broken up, the property having a few years ago come into the possession of an English nobleman, whose gamekeeper promptly declared war against the Gulls; and the ultimate result may be surmised from the fact that in the first year, among other birds, no fewer than eighty Arctic Skuas were destroyed! Wick Bay and its neighbourhood, during the herring-fishing season, afford abundant opportunities for observing the style of hunting practised by the Arctic Skua. A pair of these birds are stationed on the point of some jutting rock, or other prominent position, apparently engaged in preening their dusky plumage, and enjoying the mild summer evening; but in reality keeping a sharp look-out among the multitude of gulls of different species, Kittiwakes, Terns, &c., which hover around or rest upon the sea. Suddenly a clamour is raised by some gull—more fortunate than discreet—who has secured a fish or other prize, when its neighbours, in twos and threes, or half a dozen, crowd in, and, with appetites on the stretch, essay to snatch the tempting morsel from the very throat of the rightful owner. The shriek of triumph uttered by the poor bird as the prize is at last safely stowed away is the signal for the Skuas, who spring into the air with all the eagerness and almost the speed of the falcon, immediately give chase to the Gull, which at once perceives its danger, and strives to evade its enemies by mounting higher into the air. And now ensues a chase which is well worthy of observation, the furious assaults and sudden onsets of the pirates being for a time skilfully evaded by the Gull, which turns and doubles, and practises every possible manœuvre to shake them off, the positions of pursuers and pursued changing the while, so as to render it difficult to follow the progress of the contest. The dark plumage and rapid flight of the Skuas, pressing keenly but silently upon their victim, contrasted with the snow-white garb and noisy clamour of the gull, must, at such times, attract the attention of the least observant spectator. In this way the chase continues, until the poor Gull, thoroughly exhausted, disgorges its load of fish, which is immediately caught by the Skua. By thus pursuing and harassing the whole Gull tribe, from the Great Black-backed and Glaucous Gulls downwards, the Skuas obtain a subsistence; their victims in despair disgorging their recently swallowed—or even half-

digested food—which is often caught before it reaches the surface of the water. The Skuas also plunder other sea-birds of their eggs, and destroy numbers of young birds, eggs, &c., in the hills, the Arctic Skua having been shot in this county while in the act of killing and devouring a brood of young grouse.—W. REID (Wick).

Hybrid Finches.—In reference to the Editor's note on this subject (p. 109), I may mention that at the Canary and Cage-Bird Show at the Westminster Aquarium, in January last, the following hybrid finches were exhibited:—Two Goldfinch and Greenfinch males, six months and one year old respectively, by Mr. E. Hopton and Mr. W. Veale. Linnet and Greenfinch male, by Mr. J. Leslie. Two Bullfinch and Goldfinch males, by Mr. George Fowler, jun., and Mr. J. H. Scothern; one of these, exhibited by the latter, having the general shape of the Bullfinch, but somewhat modified, with a beautiful orange blaze. The last-named exhibitor also showed a Goldfinch and Redpoll male, six months old, and Mr. S. Hayward a Greenfinch and Goldfinch male of one year. Messrs. Welham and Hunt had a bird in this class catalogued as a Chaffinch mule, two years old.—O. V. APLIN (Great Bourton, near Banbury).

Nutcracker in Hampshire.—On February 8th at Exbury, in Hampshire, on the skirts of the New Forest, I saw a Nutcracker, *Nucifraga caryocatactes*. It was close to the house where I was staying, and I recognised the note (with which one gets very familiar in Switzerland and the Alps generally) as I laid in bed. I got up at once, and saw my friend busy amongst the cones of a large fir tree near the windows of my room. Perhaps the bird is commoner in this country than I suppose, but I never saw or heard one here before.—A. G. RENSCHAW (2, Suffolk Lane, E.C.).

[The last we heard of was one shot near Eddington, Kent, on the 17th November last. See Zool. 1885, p. 480.—ED.]

Velvet Scoter in Nottinghamshire.—On looking through the collection at Welbeck Abbey I came across a duck of this species labelled “shot on the lake here, Nov. 6th, 1884.” As this is the first and only occurrence of this duck in Nottinghamshire, so far as I am aware, I think it worthy of record in ‘The Zoologist.’—J. WHITAKER (Rainworth Lodge, Notts).

Varieties of Common Birds.—Two Jays were shot at Clumber in July last; one was quite white (though not an albino); the other was white, with dark grey markings on wing-coverts and back. The following varieties have come under my notice:—A pale cream Snipe with markings in brown, shot in Eastern Counties, given me by Mr. Edward Bidwell; a white Woodcock with faint grey markings on back, shot in Notts a few years back, given me by Mr. Jones, of Retford; a Razorbill with back of sandy colour, wings and tail cream, shot in Ireland, given me by Mr. Seeböhm; a light chocolate-coloured Blackbird, also one of a pale slate-colour; several varieties

of the House Sparrow (shot in Notts), a very pretty cream Redpoll, a sandy Yellowhammer, and a slight variety of Common Sandpiper; also a Dunlin with nearly white wings, given me by Mr. Mosley: these, with two varieties of Starlings and a white Magpie, have been added to my collection during the last few months.—J. WHITAKER (Rainworth Lodge, Notts).

Occurrence of the European Woodcock in Lower Sind.—Mr. Murray, the Curator of the Museum at Karachi, has lately shown me the skin of a Woodcock, which he had just prepared. This bird was picked up dead in General Marsden's garden at Karachi on Dec. 20th, 1885; it had not a particle of fat upon it, and probably it had died from starvation. I think I am right in stating that this is only the second recorded occurrence of this bird in Sind.—E. F. BECHER, Capt. R. A. (Karachi, Dec. 30th, 1885).

Roosting Habits of the Common Wren.—Although I have known instances of the Common Wren resorting to its old nest to roost in the winter, I never before heard of their roosting in the way they have been observed to do of late, namely, in a cocoa-nut shell suspended from the ceiling of the verandah of a house at St. Lawrence. Though there is a plant in this nut-shell, Wrens—ten in number—regularly roosted in it, till the occupant of the house, to give them more room, removed the plant, causing them to forsake the shell. To enable these ten birds to lay up in so confined a space they would be closely packed.—HENRY HADFIELD.

FISHES.

Importation of American Fish Ova.—Large consignments of Whitefish and Trout ova have arrived at the South Kensington Aquarium from America as a presentation from the Commissioners of that country. In consequence of the success attending the introduction of the first-named fish into this country last year, special attention is to be given to their culture during the present season with a view to their distribution in some of our chief lakes. The National Fish Culture Association have extended their hatchery, and, in order to secure healthy embryos, have adopted the new method, *viz.* the “underflow” system, which has been found to incubate the ova at a less rate of mortality than the “overflow” system.

Large Trout in the Hampshire Avon.—On the 23rd or 24th February a friend of mine (Mr. G. L. Polden), whilst fishing for Salmon, caught a Trout which is perhaps worth recording. It weighed seven pounds two ounces some time after it had been taken out of the water, and measured two feet three inches. It was plump and well proportioned, but not being “in season” its colours were dull. Whether it was a true River Trout I am not prepared to say, or, if a Sea Trout, I do not know that its weight is at all remarkable; but I have been told on good authority that on previous

occasions Trout weighing from eighteen to twenty pounds have been taken from the Avon near Salisbury. The fish recently taken was a male, and had the horny projection of the lower jaw well developed. Is this a mark of age, or sex, or both? It is a generally received opinion amongst anglers in this locality that its presence denotes an old male, and that its development is increased by a sojourn in fresh water.—G. B. CORBIN (Ringwood).

[The "horny projection of the lower jaw" is indicative of sex, and is peculiar to the male.—ED.]

SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

March 4, 1886. — Sir JOHN LUBBOCK, Bart., F.R.S., President, in the chair.

Mr. Gilbert C. Bourne, Mr. William Henry Catlett, and Mr. Thomas A. Cotton (N. Z.), were elected Fellows of the Society.

A paper was read, "Description of *Strongylus Armfieldi*, with observations on *Strongylus tetracanthus*," by Professor Spencer T. Cobbold. Of Armfield's Strongyle, he drew attention to the morphology of the hood and its rays, to the position of the vulva, and to the structure of the embryo. He afterwards contrasted these peculiarities with those of allied forms. Regarding his observations on the four-spined Strongyle, the following are his conclusions:—(1) The eggs are expelled from their parent in a state of fine yolk-cleavage; (2) the embryos are formed after egg-expulsion, and in a few days escape from their envelopes, undergoing a primary change of skin in moist earth during warm weather; (3) as rhabditiform nematoids they enjoy a more or less prolonged existence, probably living many weeks in this state; (4) in all likelihood an intermediary host is unnecessary; (5) the rhabdiform larvæ are passively transferred to their equine bearers either without fresh fodder or whilst the animals are grazing; (6) passively transferred to the intestinal canal, thence they enter the walls of the cæcum and colon, encyst themselves, and, according to Leuckart, undergo another change of skin; (7) their presence in the intestinal walls is associated with pathological conditions, which frequently prove fatal to the bearer, sometimes creating severe epizooty; (8) ordinarily the young worms perforate their cysts and migrate to the lumen of the bowel, where they already afford external indications of sex (*Trichonema* stage of growth); (9) they next form cocoons of the agglutination of vegetable *débris* within the gut and undergo a third ecdysis, attended with intestinal metamorphosis; (10) the formation of the internal sexual organs and the completion of the definite form is acquired within the colon of the host.

March 18, 1886.—Sir JOHN LUBBOCK, Bart., F.R.S., President, in the chair.

The Hon. J. T. Boscawen, Dr. P. Herbert Carpenter, and Arthur E. Gibbs were elected Fellows of the Society.

The only zoological paper read was "On the Madreporaria of the Mergui Archipelago," by Prof. T. Martin Duncan. The large collections from Mergui were obtained personally by Dr. John Anderson, F.R.S., Curator of the Imperial Museum of India, Calcutta. The fauna consists of eighty-four species, of which thirteen are new to Science. The new species are described, and their variability commented upon. The alliances of the fauna as a whole are with that of the Red Sea, Indian Ocean, Chinese seas, and of the great islands to the east. The author makes frequent reference to the coral alliances with a fauna described by Verrill many years ago from Panama. The fauna contains so many encrusting species of corals that they give it a definite facies. In conclusion the distinctness of the tertiary coral faunas of India from that of Mergui is announced.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

March 2, 1886.—Dr. ST. GEORGE MIVART, F.R.S., Vice-President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of February, and called attention to the receipt of five examples of a large Batrachian of the Argentine Republic, there called "Escuerzo" (*Ceratophrys ornata*), presented by Dr. Frederick C. Strutt, and to a Mantled Buzzard (*Leucopternis palliata*) from Brazil, purchased February 15th, being the first example of this fine bird of prey received by the Society.

Mr. J. G. Millais exhibited an adult specimen of the Ivory Gull, shot by himself near Thurso, in December, 1885; also a young example of the same species, obtained in Scotland in 1879.

Mr. T. D. A. Cockerell exhibited a living Slug of the genus *Parmacella*, obtained at Tangier, and probably referable to *P. valenciennesi*.

A communication was read from Prof. R. Collett, containing an account of a new Pediculate fish from the sea off Madeira belonging to the family Ceratiidæ, which the author proposed to call *Linophryne lucifer*.

Mr. P. L. Sclater read a note on the external characters of the head of *Rhinoceros simus* as compared with those of *R. bicornis*.

Mr. F. E. Beddard read a note on the air-sacs of the Cassowary.

A second paper by Mr. Beddard treated of the syrinx and some other points in the anatomy of certain forms of Caprimulgidæ.

March 16, 1886.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

Mr. F. D. Godman exhibited some examples of a butterfly, *Danaïs plexippus*, from various localities, and made remarks on its distribution, which of late years seemed to have become very widely extended.

Prof. F. Jeffrey Bell made some remarks on the *Balanoglossus* recently discovered in the Island of Herm, Channel Islands, of which he had exhibited a specimen on a former occasion.

A communication was read from the Rev. H. S. Gorham, containing descriptions of some new genera and species of Coleoptera of the family Endomychidæ from various localities.

A communication was read from Dr. R. J. Anderson, of Queen's College, Galway, containing observations on the pelvisternum in certain Vertebrates.

Prof. F. Jeffrey Bell read a paper on the generic characters of Planarians, basing his observations mainly on a specimen of a Planarian recently found living in this country, and believed to be referable to *Bipalium kewense*.

Mr. F. E. Beddard read a note on the structure of a large species of Earthworm from New Caledonia, of which examples had been recently received from Mr. E. L. Layard, H.B.M. Consul for New Caledonia.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

March 3, 1886.—R. M'LACHLAN, F.R.S., President, in the chair.

Mr. J. M. C. Johnston was elected a Fellow, and Cavaliere Piero Bargagli, of Florence, formerly Secretary of the Entomological Society of Italy, was elected a Foreign Member.

Mr. Pascoe exhibited a curious larva, probably of a *Papilio*, from Pará; and a pupa-case of *Anosia Plexippus* (*Danaïs Archippus*), from the same locality.

Mr. W. J. Williams exhibited, on behalf of Mr. C. Bartlett, a gigantic hairy and spiny larva, perhaps allied to *Gastropacha*, from Madagascar.

Mr. C. O. Waterhouse exhibited *Rutela rufipennis*, *Doryphora Haroldi*, and some other undescribed species of Coleoptera from Colombia.

Mr. Billups exhibited a specimen of *Cholus Forbesii*,—a South American species,—found alive in a horticultural sale-room in London.

Mr. Eland Shaw referred to the exhibition, at the last meeting, of *Tettix australis* from New South Wales, and called attention to the fact that the aquatic habits of certain species of the genus *Tettix* in India had been previously recorded by Leopold Fischer.

Dr. Fritz Müller communicated a paper on Fig Insects from the neighbourhood of the River Itajahi, South America; and Prof. Meldola exhibited,

on behalf of Dr. Fritz Müller, a number of specimens of the insects described in the paper.

Mr. E. B. Poulton, M.A., F.Z.S., read "Further Notes upon Lepidopterous Larvæ and Pupæ, including an account of the loss of weight in the freshly-formed pupa." The paper included notes upon points in the ontogeny of *Smerinthus* larvæ, and a description and figure of the bifid and hairy caudal horn in the newly-hatched *Smerinthus populi*. The adult larva of *Acherontia atropos* was compared with that of *Sphinx ligustri*, and the as yet unknown appearance of the former in earlier stages was predicted. Hitherto unnoticed eye-like marks were pointed out in the terrifying attitude of *Chærocampa elpenor*, and the terrifying attitude of *Dicranura vinula* was described, and its defensive fluid was shown to be strong formic acid. An eversible gland was described in *Orgyia pudibunda*, and the protection of *Acronycta leporina* was explained by its resemblance to a cocoon and the darkening of its hairs when full-fed. A valvular aperture in the cocoons of *Chloephora prasinana*, &c., was described, enabling the imago to emerge. There were also notes upon *Paniscus cephalotes*, parasitic on the larva of *D. vinula*, and tables showing the immense loss of weight in newly-exposed lepidopterous pupæ due to evaporation from the moist skin. Mr. Poulton also exhibited larvæ of *Paniscus cephalotes*. A discussion followed the reading of this paper, in which Messrs. Kirby, White, Slater, and Poulton took part.—H. Goss.

NOTICES OF NEW BOOKS.

The Badminton Library of Sports and Pastimes. Edited by His Grace the DUKE OF BEAUFORT, K.G. Vol. I. Hunting. By the DUKE OF BEAUFORT and MOWBRAY MORRIS. Vols. II. and III. Fishing. By CHOLMONDELEY PENNELL. 8vo. London: Longmans & Co. 1885.

THERE was a time when the reigning monarch in England, fearing lest the science of hunting should fall into decay, as it appeared likely to do for want of proper encouragement, entreated the French king to permit some of the leading sportsmen in France to pay a visit to the English Court in order to instruct the English in the technicalities of a sport in which at that period they were confessedly behind their Gallic neighbours; and James I., however deficient in qualities befitting a king, was too good a sportsman to let any false pride stand in the way of

advancing and encouraging the particular field-sports to which he was personally so much addicted. The best books on the subject in his day were written in French, and even our own Turberville, who did such good service by the publication of his 'Bookes of Hunting and Falconrie' in 1575 (a second edition of which appeared in 1611), was obliged to admit his indebtedness to foreign sources for the bulk of the information which he had to impart. Tardif, Du Fouilloux, and De Franchières were the authors then most studied by educated sportsmen, and the arrival in this country of such disciples of the old French school as the Marquis de Vitry and his compatriots, so far from exciting a feeling of jealousy, was hailed by English sportsmen with enthusiastic satisfaction. To this circumstance, entirely lost sight of by English historians, we are probably indebted for the maintenance of that skill in the chase for which Englishmen are now everywhere renowned, but which, at the critical period referred to, was on the verge of decadence, for want of leaders competent and willing to instruct the rising generation.

Times have altered since then, and we have now only to look into any modern French journal devoted to sport to see that our Gallic neighbours, in all that relates to horses and hounds, lose no opportunity, so to say, of borrowing a leaf from our book. And yet, although Englishmen have once more asserted their superiority in the hunting field, we look forward with some anxiety to the future of sport in this country, seeing how beset it is with difficulties at the present day. When masters of hounds and huntsmen are "boycotted," and hounds maimed or poisoned; when a so-called royal Society, with more funds than judgment at its disposal, prosecutes a royal huntsman for cruelty in taking a hunted stag; when would-be legislators, under pretence of amending the game-laws, do their best to abolish them altogether, we may well feel some concern for the future.

None too soon has a society been formed for the protection and encouragement of field-sports,* and, while wishing success to its members in their laudable object, we hail with satisfaction, as another "ante-abolition of sport movement," the scheme of

* "The Field Sports Protection and Encouragement Association," President, Lord Fitzhardinge, M.F.H.; Secretary, G. A. Battcock, 4, Carlton Street, Waterloo Place.

His Grace of Beaufort to increase the popularity of field sports in this country by the publication of an instructive series of manuals undertaken by specialists in every branch of sport.

Three volumes of this series are now before us, one on Hunting, and two on Fishing, by the authors whose names are above mentioned, and we understand that, amongst others in preparation, is a volume on Game-shooting by Lord Walsingham, and another on Wildfowl-shooting by Sir R. Payne Gallwey. It augurs well, we think, for the interests of sportsmen generally when proficient such as these are willing to become authors and impart information on subjects upon which, from personal knowledge and experience, they are so well qualified to write.

We have often had occasion to remark upon the intimate connection between Field Sports and Natural History, a sportsman's success in many cases depending upon his knowledge of the haunts and habits of the wild creatures he pursues. We shall, in this notice of the volumes before us, consider their merits chiefly from the naturalist's point of view, avoiding the technicalities of sport as being less suited for discussion in this journal.

The volume on Hunting appropriately commences with a chapter on the history and literature of the chase, but, although very agreeably written, it falls far short, in our opinion, of what such a chapter ought to be. In the first place, the historical notices are not given in chronological sequence; for example, after glancing at the Book of St. Albans (1486), and the Treatises of Turbervile (1575), and Cockaine (1591), we are carried back to the days of Canute and Edward the Confessor, when the important forest laws of the former and hunting proclivities of the latter are disposed of in about a dozen lines! In the next place, there are some extraordinary gaps in this "history," notably the omission to give any information respecting Hunting in the days of James the First, who spent more time in the hunting field than in the council chamber. This oversight is the more remarkable, because the events of that monarch's reign, as we have already hinted, have an important bearing on the history of the chase in England, and ample materials of much interest to sportsmen are available for a chapter on the subject, and a long chapter, too. Nor is anything said of the influence which the French and Italian Schools of Hunting exercised

upon our ancestors at this period in the history of the chase in England.

The Appendix to this chapter, entitled a "Bibliography of Hunting and Hunters," stands in need of considerable revision. We are afraid to say how many errors we have detected in these nine pages, chiefly, it would seem, from an omission to consult the originals of the works cited. The date of the first edition of the 'Boke of St. Albans' is 1486, not 1481, as stated on the first page of the Appendix. In the succeeding title there is an extraordinary confusion of ideas. Thus the title runs:—

The Treatises of Hawking, Hunting, Coat Armour, Fishing, and Blazing of Arms. Edited by Joseph Haselwood, printed by Wynkyn de Worde. Westminster, 1486. Fol. Another edition of the above.

From this it might be inferred by the unwary that Joseph Haslewood was a contemporary of Wynkyn de Worde, that the edition of 1486 was printed at Westminster, and that there was an earlier edition than this of the work. The facts are, in 1486 the first edition was printed at St. Albans, that in 1496 the second edition was printed by Wynkyn de Worde at Westminster, and that in 1810 Joseph Haslewood reprinted Wynkyn de Worde's edition with an excellent introduction of his own.* Of the numerous subsequent editions of this work the Appendix in question mentions but three. Of Gervase Markham's at one time popular work, 'Country Contentments,' only one of the fourteen editions is noticed, the title of his 'Gentleman's Academie,' 1595, is incorrectly quoted, and no mention is made of his 4to treatise on the Hunting Horse, 1599. There are numerous errors in authors' names (those of Turbervile, Somervile, Cockaine, and others, being mis-spelled), as also in the sizes of books, Gyn-dall's work, for example, being a quarto, not a folio, and Blome's being a folio, not a quarto.

Nor is the bibliography so complete as it might be made, several notable works having been overlooked, as, for instance, the excellent translation of Arrian's "Cynegeticus," by "a graduate of medicine," printed in 1831, with an account of the *Canes venatici* of classical antiquity. For our own part we should have included the best editions of the works of Xenophon,

* It appears to have escaped the notice of critics that, although Haslewood's title-page bears date 1810, his Introduction is dated 30th Oct., 1811.

Arrian, and Oppian on Hunting, and as the old French treatise of Guillaume Twici is cited, mention should also have been made of the better-known works of Tardif and Du Fouilloux, especially as it was to the last-named author that our English Turberville was mainly indebted when compiling his 'Noble Art of Venerie, or Hunting,' in 1575. Amongst works of later date we should have expected to find W. Blane's "*Cynegetica: or Essays on Sporting*," consisting of observations on Hare Hunting, &c., 8vo, London, 1788, a book now seldom to be met with, but none the less deserving of mention.

It is unnecessary, however, to pursue our criticism of this part of the Badminton volume further. Suffice it to say it is the weakest portion of the book.

The second chapter of some fifty pages is entitled 'Beasts of the Chase,' and deals with the Stag, Fox, and Hare, in a highly entertaining manner, descriptions of the habits of these animals being pleasantly blended with instructions for hunting them. Passing over chapters III. to X., which deal with such subjects as the Stable, Kennel, Hunt Servants, the Horse, the Rider, &c., we come to Chapter XI., one of the best in the book, on "The Otter and his Ways."

Human nature, we know, is little inclined to believe what it cannot see or realise, and doubtless the Otter and his habits are mysteries to most men, inasmuch as he is strictly a nocturnal animal, never quitting his stronghold, except by compulsion, till after sunset, and then only to seek his prey and to disappear again with the first blush of morn. Then at night, if intruded on by man, the dark colour of his fur conceals him from view, while at the same time so eel-like and gentle are his movements in the water, that it would require a fine ear indeed to note his whereabouts:—

"The ways of an Otter," says our author, "are probably the least known and the most inscrutable of all our wild animals: so much so that its very existence is widely doubted in districts where Otter hounds are never seen; and yet every river in the land pays tribute in turn to this night-wandering marauder."

In the following passage we are glad to find an assurance that, in spite of persecution, there is no reason to apprehend that the Otter is in any immediate danger of becoming extinct:—

“Many think the Otter to be well nigh exterminated, and that its fate will soon be that of the Beaver and Yellow-breasted Marten, now no longer seen amongst us. But there is no ground whatever for this belief; Otters, as I will presently show, by testimony of unquestionable authority, are still as plentiful in our waters at the present day as they were fifty or sixty years ago.”

The whole of this chapter, a long one, and the last in the book, will well repay perusal.

Amongst the appendices which follow, the only one calling for notice in these pages is that on the Bibliography of Hunting already criticised.

The two volumes on “Fishing,” both by Mr. Cholmondeley Pennell, are devoted the one to Salmon and Trout, the other to Pike and Coarse Fish. On the whole, it may be said that these two volumes contain fewer observations on the natural history of freshwater fish than on the various methods of catching them, although we must not omit to state that in one of the volumes there is a long chapter on the natural history of British *Salmonidæ*.

In this Chapter Mr. Pennell divides the different species of *Salmonidæ* into two groups: the silver or migratory, and the yellow or non-migratory; the first group comprising those fish which migrate periodically to or from the sea, *viz.*, the true Salmon, the Bull Trout, and the Sea Trout, and the second group those whose habits usually confine them to fresh water, lake or river, *viz.*, the Common or Yellow Trout, the Great Lake Trout, and the Grayling. “This grouping,” says Mr. Pennell, “commends itself not only by its simplicity and convenience of classification, but also by such broadly-marked distinctions in regard to habits, localities, &c., as must override distinctions founded upon mere technical differences.”

The remarks on Thames Trout (pp. 164-5) will have an interest for many persons besides professional anglers, and we shall be much mistaken if the practical advice given in the chapter on Thames Trout Fishing, by Mr. H. R. Francis (pp. 410-33) does not make numerous converts to the gentle art amongst those who have hitherto been too fond of quoting the definition of a fishing-rod attributed to Dr. Johnson.

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THIRD SERIES.

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[No. 113.]

ON THE BLACK-THROATED WHEATEAR, *SAXICOLA STAPAZINA*, AND ITS ALLIES.

BY HENRY SEEBOHM.

IN the spring of 1878 an example of the Black-throated Wheatear, *Saxicola stapazina*, was shot near Bury, in Lancashire. In November of the same year it was exhibited at a meeting of the Zoological Society in London (Proc. Zool. Soc. 1878, pp. 881, 977). I compared it at the time with skins from Spain, Greece, and Asia Minor, and came to the conclusion that it agreed best with eastern examples, though it was not a very extreme form. In 1874, when Mr. Dresser published the part of the 'Birds of Europe' containing the history of this species and its allies, he recognised the distinction between the eastern and western races as specific, though he made a most extraordinary muddle of the synonymy; in some cases transferred the account of the habits and nidification of one species to the other, and figured and described immature examples as adult in both cases.

In 1883 I included the Black-throated Wheatear in my 'History of British Birds' (i. p. 307), pointing out that it was an example of the eastern race that had honoured our islands with a visit. I regret to say that in my synonymy of the Black-throated Chat, which I treated as one species, two misprints have occurred. In the second and in the last names on the list the words "Western form" ought to read "Eastern form."

ZOOLOGIST.—MAY, 1886.



In 1885 Mr. Mitchell included the Black-throated Wheatear, under the name of *Saxicola stapazina*, in his 'Birds of Lancashire' (p. 10), accompanied with a plate; and in the same year it appeared, under the same name, in Lord Lilford's 'Coloured Figures of the Birds of the British Islands.' Neither of these plates were drawn from the Lancashire specimen, and both of them unquestionably represent the extreme Spanish type. Of the two forms or subspecies of Black-throated Chat, the western form, *S. stapazina*, breeds in Spain, and occasionally in the Riviera; whilst the breeding range of the eastern form, which must be called *S. stapazina melanoleuca* (if it be worthy of a name at all, which is very doubtful) extends from Trieste, through Greece and Asia Minor, to South Russia and South Persia.

It is absurd to regard the two forms as specifically distinct, as Mr. Dresser has done, inasmuch as a perfect series from one to the other can be obtained, and of the intermediate forms it is absolutely impossible to tell by looking at them whether they were shot in Spain or Asia Minor. The two forms only differ in two slight particulars. Spanish examples have, as a rule, rather less black on the throat, and rather more buff on the back, than examples from Asia Minor.

After a very careful re-comparison of the British example with examples of both the western and eastern forms, I still adhere to my previous opinion that it belongs to the eastern form. It is not a very characteristic example, but it is uncommon to find a Spanish example with quite so much black on the throat, whilst examples with no more, or even with slightly less, are not rare in Asia Minor. As regards the buff on the mantle, its almost entire absence is confirmatory, so far as it goes, of the correctness of my identification.

Both Mr. Mitchell's plate and that of Lord Lilford represent Spanish birds, and are well and correctly drawn; but nothing could be more misleading than the figures of these two birds in Dresser's 'Birds of Europe.' The Spanish form is represented with the head bent down, so as to make the black on the throat look as small as possible, whilst the Asia Minor form is drawn with the head lifted up, to exaggerate the black as much as possible. Neither bird is fully adult.

In Asia Minor a very nearly allied species is found, which has still more black on the throat, and further differs from

S. stapazina in having all the tail-feathers broadly tipped with black. This species was described by Heuglin, under the name of *S. finschii*, and was figured by Mr. Dresser, under the erroneous name of *S. erythræa* of Hemprich and Ehrenberg. The British specimen is adult, as are the figures of the Spanish form in the books of Mr. Mitchell and Lord Lilford. The white on many of the tail-feathers runs out to the point. In the female, and young male in first plumage, of *S. stapazina*, all the tail-feathers are broadly tipped with black, as in the adults of *S. finschi*. This is also the case with birds of the year. Chats only moult once a year, and in their first spring the buff tips of the wing-coverts are cast, or abrade, and the bird is to all appearance adult, and probably breeds; but on examination it will be found to have an immature tail.

Mr. Dresser's description and figure of *S. melanoleuca* (mis-called adult) is that of a bird of the year in its first spring dress. So is his description and figure of (so called adult) *S. stapazina*, to which he again erroneously applies the name of *S. rufa*. This name is founded on the *Vitiflora rufa* of Brehm, dating from 1831; but this name cannot possibly stand under the law of priority, since Mr. Dresser himself includes the name *Vitiflora rufa* of Stephens, dating from 1817, under the synonyms of the Black-eared Chat. The transference by Mr. Dresser to the last-mentioned species of the name of *S. stapazina* has been universally condemned by ornithologists, but to those who object to use it for the Spanish form of the Black-throated Chat I recommend the name of *Saxicola dresseri*, in commemoration of his ineffectual attempt to rectify the nomenclature of the genus.

In conclusion, I beg to express my thanks to Mr. Doeg for having given me an opportunity of examining a second time the example procured near Bury.

NOTES ON THE VERTEBRATE ANIMALS OF LEICESTERSHIRE.

BY MONTAGU BROWNE, F.Z.S.

Curator, Town Museum, Leicester.

(Continued from p. 167).

Order STEGANOPODES.—Family PELECANIDÆ.

Phalacrocorax carbo (Linn.). Cormorant.—Has once occurred in the county. Mr. J. Potter, station-master of East Langton, the owner of the specimen, an immature bird, writes me that it was caught alive in a grass-field near Langton Hall on Sept. 6th, 1883, after a strong gale the previous day from the S.W.

Sula bassana (Linn.). Gannet.—An accidental visitant. A young male of the year was picked up in a dying condition on the borders of Buddon Wood, near Quorndon. Potter refers to it as in the possession of Miss Watkinson, of Woodhouse. Another immature bird of this species, which had been wounded, was picked up half dead at Shangton in 1878 (Mid. Nat. 1882, p. 79). A third, also a young bird, shot between Bottesford and Scarrington, near the River Smite, is in the possession of Mr. H. V. Flower, of Scarrington, and I have heard of others having been killed at Somerby and Houghton-on-the-Hill, the last in September, 1869.

Order HERODIONES.—Family ARDEIDÆ.

Ardea cinerea, Linn. Heron.—Resident, generally distributed, and “breeding in a few localities, as at Stapleford, the seat of Lord Harborough, and formerly at Mere Hill Wood, by Cotes, two miles south of Loughborough, and in Martenshaw Wood, where, in the spring of 1840, the birds were shot down and destroyed.” A “white Heron” is stated by Harley to have been shot some years ago at Groby Pool. He describes it as purely white, with black legs and a yellow bill, having also an elongated occipital crest like that of the grey species, of which he considered it an albino. In this opinion, it appears, he was confirmed by Macgillivray. It appears to me that, disregarding the colour of the bill, it might have been—if not *Ardea alba*—a specimen of *A. garzetta*. Nothing is said as to size, and so the matter is veiled

in mystery, unless indeed the actual specimen can be discovered.* I am informed by Henry Long, keeper at Bosworth Park, that some years ago a single pair of Herons built a nest there. There was a solitary nest also in Buddon Wood in 1885, and another the same year at Bradgate. For several seasons a pair nested in a wood at Belvoir. On May 5th, 1884, I went over to Stapleford Park, by permission of the Rev. B. Sherard Kennedy, to see the heronry, and if possible procure a pair of old birds with the nest and young for the Museum. I found the heronry had increased since Harley's time, from forty to fifty nests being built in high elms and spruce firs on an island in the lake, to which the keeper rowed me. Nests and birds were so plentiful, and the latter doing so much damage to the fishery, that the keeper asked me to shoot several, and firing altogether nine rifle shots I bagged eight birds, five of which—including two large young ones—are, with their nests and an egg (picked up from the ground) in the Leicester Museum, mounted in a plate-glass case, six feet cube, the nests being embellished with the leaves and buds of the elm carefully reproduced by modelling on the natural twigs.

Ardetta minuta (Linn.). Little Bittern.—A very rare visitant, which, according to Harley, "has once occurred, namely on the banks of Groby Pool at the close of the summer of 1853."

Nyctocorax griseus (Linn.). Night Heron.—Like the last-named, a very rare visitant, of which Harley says:—"An example occurred a few years since in the lordship of Ansty, and was shot by a countryman as it was sitting on the top of a pollard willow by a pool. I examined it shortly after capture. Mention is made of another bird having been shot in the year 1846, at Donnington, as I gather from the manuscript of the Rev. Arthur Evans."

Botaurus stellaris (Linn.). Bittern.—An accidental visitant. Potter, in his 'History of Charnwood Forest,' says, "One was shot near Ashby in 1834, by the late Mr. Joseph Cantrell; another, killed at Wanlip, is in the possession of Sir George J. Palmer, Bart.; a third, shot at Glenfield, is in the possession of C. Winstanley, Esq., of Braunston Hall." Widdowson writes that he has "known about six killed in his neighbourhood in about

* In our opinion the bird in question is more likely to have been a Spoonbill, *Platalea leucorodia*.—ED.

twenty-five years." The Museum contains a fine example (probably a male) shot at Enderby, and presented by Mr. William Simpson, December 21st, 1871. A female Bittern was also presented to the Museum by Mr. E. Willars on March 4th, 1885, which was shot at Cropston Reservoir. It had been seen about the place for two or three weeks, evidently in a wounded condition. The measurements were as follows:—Extreme length, 26 inches; tarsus, $3\frac{1}{2}$ inches; wing, $11\frac{1}{2}$ inches; culmen, nearly $2\frac{3}{4}$ inches. Colour of beak, yellowish grey; around eye, lighter greenish grey; eye, bright yellow; legs and toes, greyish yellow, like a Snipe's. I gave Mr. Macaulay a note of two Bitterns, said to have been shot near Lutterworth, which he recorded in the 'Midland Naturalist.' I have since had reason to believe, however, that this was a fraud, and that the birds were purchased in Leadenhall Market.

Family CICONIIDÆ.

Ciconia alba, Bechstein. White Stork.—A rare visitant. Harley states that one was obtained near Melton Mowbray in 1849, and the narrative of its capture was related to him by a resident of that place, Mr. Widdowson, who had the bird in his possession. One in the possession of Mr. T. Morris, of Wycombe, near Melton Mowbray, was shot by his brother early one morning as it sat on one of his farm-buildings at Scalford Lodge, in 1851. I am not sure if this is the one alluded to by Harley. Another specimen of this bird was shot at West Leigh, Narborough Road, on March 6th, 1873, and was presented to the Museum, where it still remains, by Mr. Archibald Turner.

Plegadis falcinellus (Linn.). Glossy Ibis.—Another rare visitant. Mr. Macaulay states (Mid. Nat., 1882, p. 77), "The Bickley collection in the Leicester Museum includes a specimen of this bird. I have been recently informed by the donor's brother that it was killed on the border of the county and within it." On the back of the case, however, it is thus labelled:—"This rare and valuable specimen was shot near the Derby Railway Station in February, 1842. H. B." Also, "Killed near Derby, February, 1842."

Order ANSERES.—Family ANATIDÆ.

Chenalopex ægyptiacus (Linn.). Egyptian Goose.—This species is so often kept in a state of semi-domestication on

private waters, and so often contrives to effect its escape, that it is very doubtful if any of the specimens which are from time to time shot in a state of freedom are really wild birds. Harley states that one was shot close to Leicester on the 4th March, 1843. It bore no signs of captivity, and had three companions, which went away in a southerly direction. This is probably the specimen which is in the Leicester Museum, marked in the old MS. Donation Book, "shot on the River Soar, 1843," by Mr. H. S. Hamel. Another entry records that a specimen "shot at Oakham, November 13th, 1858, was presented by Mr. F. Palmer."

Anser cinereus, Meyer. Grey Lag Goose.—An uncommon winter visitant. According to Harley, shot in the county during the hard winter of 1842, and, according to Macaulay ('Midland Naturalist,' 1883, p. 86), one was shot at Shangton on the 12th December, 1882.

Anser segetum (Gmelin). Bean Goose.—An uncommon winter visitant, which has, however, been met with in various parts of the county. The most recent instance of its appearance in Leicestershire, so far as I am aware, occurred in December, 1880, when "a specimen was shot at Noseley by Mr. A. M. Hazlerigg."

Anser albifrons (Scopoli). White-fronted Goose.—An uncommon winter visitant. I have seen a fine specimen which was shot at Tur Langton on 18th December, 1879, by Mr. Owen West, as recorded by Mr. Macaulay ('Midland Naturalist,' 1882, p. 11).

Bernicla brenta (Pallas). Brent Goose ("Black Goose").—An uncommon winter visitant, the occurrence of this species inland at a distance from the sea being very unusual. Harley, however, states that "several were shot in the lordship of Kirkby Mallory," in December, 1844. The MS. Donation Book, Leicester Town Museum, records one shot at Syston, and presented by the Literary and Philosophical Society on January 28th, 1854.

Bernicla canadensis (Linn.) Canada Goose.—An introduced species, often found at large, especially in winter. "During the summer of 1844," according to Harley, "a pair bred on an island in the middle of Groby Pool, but it was not certain that the eggs were productive." There are two in the Leicester Museum,

marked in the old MS. catalogue as "shot on Groby Pool, April, 1844. Part of a flock of twenty." Probably those referred to by Harley. Mr. Widdowson told me that four came to Stapleford Ponds about 1876, two of which were shot. Messrs. Lever and Moss have recorded in 'The Zoologist,' 1885 (p. 259), the nesting of this bird on a pond at Garendon. Being at Belvoir in 1884, I saw a skein of Geese flying high overhead, going eastward, and called Mr. Ingram's attention to this, who replied, "Only our Canada Geese going to feed on the marshes." In September, 1885, five were shot out of a small flock near Melton.

Cygnus olor (Gmelin). Mute Swan.—Breeds at Abbey Park, Leicester, Thornton Reservoir, and other places in the county.

Cygnus musicus, Bechstein. Wild Swan ("Whooper").—An uncommon winter visitant. Potter, in his 'History of Charnwood Forest,' says:—"Seen at Bardon formerly; in the neighbourhood of the Forest rarely shot. One killed near Wanlip Hall was in Mr. Gisborne's collection at Yoxall Lodge; and another was killed at Groby." Harley says, "It has occurred on the Soar at Loughborough, and also at Groby Pool, as I learn from Mr. Chaplin." Mr. Chaplin died October 20th, 1855.

Tadorna cornuta (S. G. Gmelin). Common Sheldrake ("Burrow Duck").—"Three were shot at Barkby, February, 1881 (Mid. Nat., 1882, p. 78), one of which, a male, I saw in the possession of a bird-stuffer named Donnell."

Mareca penelope (Linn.). Wigeon.—A winter visitant. Not uncommon on the rivers Soar and Trent, as well as on such large sheets of water as Saddington and Knipton Reservoirs.

Dafla acuta (Linn.). Pintail.—A winter visitant, but not common. Examples have been shot at Groby Pool, and at Kilby Bridge, as well as in the Abbey Meadow.

Anas boscas, Linn. Wild Duck ("Mallard").—Generally distributed and breeding. Harley found a nest in the crown of a willow pollard several feet from the ground. Mr. W. Groves asserts that he saw a duck sitting on a clutch of eleven eggs deposited in an oak tree at a height of ten feet from the ground in Bradgate Park, in 1881. The Wild Duck is seldom absent from the Belvoir Lake, or Reservoir, where it breeds regularly, as it does also at Rolleston and Saddington.

Querquedula ciria (Linn.). Garganey ("Summer Teal").

—A rare summer visitant. It is here included on the authority of Mr. Macaulay, who shot four (at one shot) at Saddington Reservoir, in July, 1868.

Querquedula crecca (Linn.). Common Teal.—Generally distributed and breeding. Has been met with on the mill-stream at Blaby Mills; in the Abbey Meadow; on the lake at Belvoir; and at the reservoirs of Saddington and Knipton. Harley came across a brood in a pond choked with rushes and sedges near Dishley Mill. The nest, composed of rushes and grass, and lined with down, was carefully concealed beneath a small shrub which overhung the pond. Both parents assisted in the care of the young. In 1844 there was another nest of this species on the banks of Groby Pool, where the young, seven in number, came abroad early in the month of June.

Spatula clypeata (Linn.). Shoveller.—A rare winter visitant. A specimen recorded in Potter's 'History of Charnwood Forest' as killed near Charnwood Heath, was in the collection of Mr. Gisborne, at Yoxall Lodge. It has also been met with on Groby Pool, at Barratt, Syston, Gumley, and Blaby Mills.

Fuligula cristata (Leach). Tufted Duck.—Not uncommon. Probably a resident. Potter, in his 'History of Charnwood Forest,' says that it has been shot at Groby by Lord Stamford's keeper. It has also been killed frequently on the River Soar, and on the lake at Belvoir, as well as at Coleorton Hall, Little Dalby, and upon several large pools in the county, such as Saddington Reservoir.

Fuligula marila (Linn.). Scaup.—A rare winter visitant. One was shot on Saddington Reservoir in 1874 ('Midland Naturalist,' 1882, p. 79.)

Fuligula ferina (Linn.). Pochard ("Dunbird").—An uncommon winter visitant. Has been met with at Groby Pool, Kegworth, and Leesthorpe. A male Pochard shot at Saddington Reservoir, January 15th, 1886, by Mr. A. Perkins, and presented by him to the Leicester Museum, weighed 2 lbs. 1 oz.

Clangula glaucion (Linn.). Goldeneye.—An uncommon winter visitant, but more often met with in severe winters. Examples have been obtained at Groby Pool, Bosworth, Saddington, and near Oakham. Mr. John Ryder sent to the Museum a beautiful adult male specimen, shot on the lake at Belvoir, on 28th October, 1885.

Cosmonetta histrionica (Linn.). Harlequin Duck.—Of this rare Duck, Harley writes, “The Harlequin Duck appeared in the county during the heavy frost of 1845, when several examples were captured on the pools and waters in different parts of Leicestershire. Mr. Chaplin, of Groby, shot a pair on the pool in the early part of 1845, where they were associated with Scoters, Tufted Ducks, Teal, and Wigeon.”

Edemia nigra (Linn.). Common Scoter (“Black Duck”).—Not unfrequently driven in by the easterly gales, and appearing upon our reservoirs as at Saddington, where a flock of twenty appeared on September 3rd, 1881. During August and September, 1881, three were killed there, one of which (a male), shot on September 3rd, was presented to the Leicester Museum. Others have been procured at Melton and Bosworth Park. Mr. J. Whitaker, of Mansfield, Notts, obligingly writes me that he possesses two adult males shot out of a flock at Thornton Reservoir, September 18th, 1879, by Dr. John Wright, of Markfield (see ‘Zoologist,’ 1879, p. 459).

Mergus merganser (Linn.). Goosander.—A rare winter visitant. Potter, in his ‘History of Charnwood Forest,’ notices one shot near Langley Priory; and another, killed on the Smeeton Canal in 1862, is recorded in the ‘Midland Naturalist,’ 1882 (p. 79). There is in the Leicester Museum a fine male in adult plumage, shot near Blaby, December 17th, 1875, and presented by Mr. William Gregory.

Mergus serrator, Linn. Red-breasted Merganser (“Sawbill”).—A rare winter visitant. One shot on the pool at Coleorton Hall about 1860 is recorded in the ‘Midland Naturalist,’ 1882, p. 79. It is preserved in the collection of Sir G. Beaumont.

Mergus albellus, Linn. Smew.—A rare winter visitant. During the severe weather of February and March, 1845, this species was frequently met with in company with Scoters, Pochards, and Wigeon, on Groby Pool, and on the Trent. Mr. J. Whitaker, of Rainworth Lodge, Mansfield, has an adult male, shot at Thornton Reservoir in 1877 (see ‘Zoologist,’ 1884, p. 52). Mr. Woodcock, of Rearsby, shot a fine Smew in the River Eye, in the parish of Wyfordby; and shortly afterwards Mr. North, of Syston, shot another.

(To be continued.)

FACTS IN THE LIFE-HISTORY OF THE CUCKOO.

BY JOHN HANCOCK.*

For many years I have been desirous of observing the habit of the young Cuckoo at the time when it was just hatched, and when it was busy in ejecting the eggs and young of its foster-parent from the nest. During my stay at Oatlands in the summer of 1884 I am glad to say that a favourable and satisfactory opportunity occurred of making this observation.

I began in June to search the grounds carefully for as many nests as I could find that were likely to have Cuckoos' eggs in them, and was fortunate enough to find one in a spot convenient for making continued observations, on the 17th June, 1884. The Cuckoo's egg was in the nest of a Hedge Accentor, containing four of its own eggs, and built in a bramble-bush near the bottom of the sloping terrace at Oatlands. I tried the Cuckoo's egg and one of the Hedge Accentor's in water, to ascertain if they were fresh or sitting. The former floated, denoting that it was sitting; the latter, sinking to the bottom, was, of course, fresh.

On the 25th June I examined the nest. No change had taken place. There were still the one Cuckoo's egg in the nest and the four Accentor's.

On Friday, the 27th June, I looked at the nest at three o'clock in the afternoon, and the Cuckoo's egg was hatched, and one of the Accentor's. At twenty-five minutes to six o'clock I looked at the nest again, and another Accentor's egg was hatched.

On Saturday morning, 28th June, I rose early, and went to the nest at twenty minutes to four o'clock a.m. All was quiet, and the old bird on the nest. At two minutes past five o'clock saw into the nest. There were just the young Cuckoo, the two young Accentors, and the two eggs. A few minutes after five o'clock the young Cuckoo attempted to put an egg out of the nest, by getting it on to its back in the most clumsy manner; but it did not succeed in getting the egg high enough to roll it over the edge of the nest. Immediately after this proceeding

* "Note on the habit of the young Cuckoo in ejecting the eggs and young of its foster-parent from the nest, observed by John Hancock, at Oatlands, Surrey, in June, 1884." Reprinted from Nat. Hist. Trans. of Northumb. and Durham, vol. viii.

the old Hedge Accentor came on to the edge of the nest, and stooped down with its head into the nest, and took some white matter into its mouth (I think excrement from the young birds) and swallowed it. The old bird went on to the nest and off again four or five times in about two hours. I left for breakfast at eight o'clock, the old bird sitting on the nest. Returned at half-past eight. The old bird was off the nest, and the young and eggs as before lying quiet at the bottom of the nest. I don't think the young birds have been fed yet. The old bird has returned, and is sitting on the nest. I feel sure that the old bird takes the dung from the young birds and eats it. The old bird remains off about ten minutes at a time. She is back and on the nest again this time in a minute or two. She appeared to be very uneasy and uncomfortable, raising her wings and standing on her legs in the nest. In this position she made a kind of shuffle, and in a moment the Cuckoo was on the back of the Hedge Accentor, and in another moment the Accentor was off the nest and the Cuckoo into the nest off her back (what this meant it is impossible to say). The mother was off for about ten minutes, and then on again and off, and when off an Accentor's egg was put on to the edge of the nest by the young Cuckoo in my presence. This was at half-past ten. The egg rested on the edge of the nest for some time, and then it fell down into the bush, by the movements of the old bird on the edge of the nest. The Cuckoo then fell into the bottom of the nest, apparently in a very agitated state, and overpowered or exhausted by the effort. The mother then returned again to the nest, and proceeded as before in taking off the dung from the young and eating it. She remained a very short time on the nest, but seemed very uneasy, raising herself and standing in the nest. The Cuckoo seems to be increasing in bulk, and is much agitated, lying at the bottom of the nest. The two young Accentors lay motionless at the bottom of the nest, while the Cuckoo kept moving its wings like hands, as if to excite or stir its companions into action. In about twenty-five minutes the Cuckoo made two desperate efforts to get one of the young Accentors flung over the edge of the nest, but failed, for when it got the young one to the top it fell back again into the bottom of the nest. Another unsuccessful struggle took place when the mother was on the side of the nest. About eleven

o'clock the first young Accentor was put over the edge of the nest, exactly as illustrated by Mrs. Blackburn.* The mother was present, but took no notice of the affair going on, but looked on calmly. The second egg was pushed out at one p.m., in the presence of myself, Miss Abbs, and my sister, whom I had specially invited to come and see the proceedings of the young Cuckoo. The last and fourth of the lot we left in the hands of the destroyer. It was sitting almost on the back of the Cuckoo, which had had one try to put it over the edge of the nest, but had failed. At 3.30, when we returned to examine the nest, the young Cuckoo was the sole occupant.

The first baby Accentor which had been thrown on to the edge of the nest was still alive, so we put it into a Whitethroat's nest, which had four young ones about a day old, and from all appearances it will be properly attended to by its foster-parents.

The Cuckoo's proceeding, as I saw it, is, in my opinion, the most wonderful and unaccountable piece of business that I ever witnessed in bird-life.

On Saturday, July 5th, I looked into the nest, and, to my astonishment, the young Cuckoo lay motionless at the bottom of the nest, and I found that it was dead. In all probability it had died from the heat of the sun, for a day or two before, when looked at, the Cuckoo was panting, evidently affected by the heat; in fact, we had shaded it, by placing some bracken leaves to screen it from the sun, but by some means the leaves had been removed, and the sun's rays fell direct on the young Cuckoo.

To summarize this account, I may state that the eggs of the Cuckoo and four eggs of the Accentor were found in the nest of the Accentor on the 17th June. On Friday, June 27th, the Cuckoo's egg and two eggs of the Accentor were hatched. On Saturday, June 28th, one attempt to put out Accentor's egg did not succeed. At 10.30 a.m. first egg was put out of nest. About 11 a.m. the first young Accentor was pushed out. At 1 p.m. the second egg was pushed out in the presence of three witnesses. The last of the lot, the second young Accentor, was removed between 1 and 3 o'clock p.m., during the time I was away or absent.

* See 'The Pipits,' illustrated by J. H. B., Plate XI. 1872.

These observations, though they may seem to be a repetition of the accounts given by Dr. Jenner, Montagu, Mrs. Blackburn, and other accurate observers, are nevertheless necessary in these days, for in the minds of some ornithologists it seems to be still an undecided question how the young Cuckoo gets the young of its foster-parents from the nest. I have before had an opportunity of ascertaining the fact, and expressing my full belief in the accounts given by Dr. Jenner, Col. Montagu, and others, as stated in my 'Catalogue of the Birds of Northumberland and Durham' (p. 26), but till last summer I had not had a successful opportunity of watching the whole process so carefully as I was able to do on that occasion.

Since these remarks were written my attention has been directed to the following quotation from Mr. Henry Seebohm's 'History of British Birds' (vol. ii. p. 383):—"It has been said, on what appears to be incontestable evidence, that the young Cuckoo, soon after it is hatched, ejects the young or eggs from the nest by hoisting them on its back; *but one feels inclined to class these narratives with the equally well-authenticated stories of ghosts and other apparitions which abound.*"

The facts, observed with much care, and minutely narrated in this note, support the "incontestable evidence" given by Dr. Jenner, Montagu, and Mrs. Blackburn, so fully and conclusively, that I am at a loss to understand how any one who has not personally investigated and observed this habit of the young Cuckoo could allow himself to express so strong an opinion as Mr. Seebohm has done in the italicised portion of the above quotation.

There are still many points in the life-history of this interesting summer visitor which require to be worked out accurately. There are many questions regarding it which no ornithologist is able to answer satisfactorily, as for instance:—

Is it the male or female Cuckoo that produces or utters the well-known familiar note, or both?

Most of the Passeres moult before migrating. Does the young Cuckoo moult before migrating? or does it moult in its winter quarters?

How does the old Cuckoo come to the knowledge of the time when it must place the egg in the nest it selects for that purpose? For if the Cuckoo's egg should not hatch for a few days after

the others, the young Cuckoo would be too feeble to perform the operation of lifting the young of its foster-parents over the edge of the nest.

In concluding these observations, I cannot help pointing out that the recent provisions of the Wild Birds Protection Act prevent, at present, in England, any further investigations on these and other important points in bird-life, which require to be made during the breeding season, in order to complete our knowledge and perfect the history of our British bird-fauna.

A MARINE MONSTER IN MOUNT'S BAY, CORNWALL.

BY F. W. MILLETT.

FROM an early hour on Saturday, January 23rd, a large creature was observed swimming about Mount's Bay, and was watched by many persons who supposed it to be a Whale. About midday my attention was called to the animal, then distant about a mile and a half, and, with the aid of a good telescope, I observed it carefully for more than an hour, the sea being quite smooth and the air clear, but unfortunately the creature was situated so near the glare of the sun that little more than its outline could be made out. That it was not a Whale was evident at the first glance, the portion showing above water being rugged and irregular, and only by its motion distinguishable from a ledge of rock. The creature appeared languid in its motions, there was no plunging or darting, it simply rose or sank in the water, showing at the surface for a few minutes and disappearing for about the same length of time, and moving along slowly and steadily. Generally nothing more was visible than the longer portion represented in fig. 1, but now and then the head appeared above the surface. This was about six feet long, oblong in form, with a large lobe at each angle, as shown in fig. 2. At no time was the whole of the head visible above the surface, although light could be seen under the neck close behind the head; it was therefore impossible to observe any trunk, tentacles, or tusks that may have been attached to the lower part of the head. Once, whilst the remainder of the animal was submerged, the portion represented in fig. 4 appeared above the surface; this

was arched with a central rib, not unlike the fluke of an anchor. Three times appeared a member (fig. 5) resembling the fin of a Sunfish (*Orthogoriscus*), but possibly it was cylindrical. As each time that it appeared the rest of the animal was under water, it could not be ascertained to what part of the body it was an appendage.

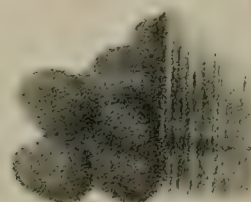
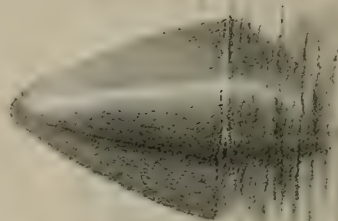
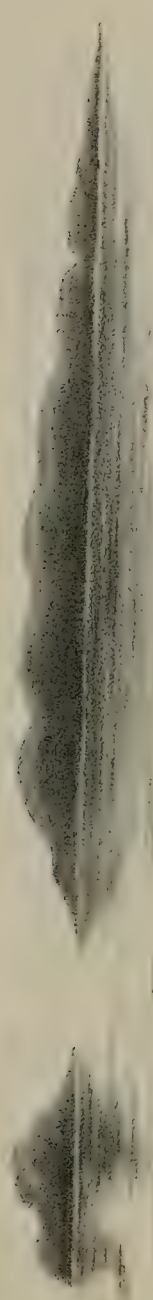
Fig. 3 represents the appearance of the animal swimming away from the spectator, a large broad back like the carapace of a turtle preceded by the head showing the two upper lobes, the whole much resembling a Hippopotamus, but with the head disproportionately small.

The length of the creature, showing above the surface, was probably over thirty feet, the colour a leaden grey, changing to tawny at the extremities.

About half-past one o'clock some men went off from Marazion in a boat for the purpose of observing the animal at close quarters. One of them, Mr. James Parsons, has spent the greater part of his life in the navy, and in his voyages all over the globe has had abundant opportunities of observing the large sea animals. He is thoroughly acquainted with the appearance and manners of the various kinds of Whales, Sharks, Walrus, and the Devil-fish of the West Indies; but, although he observed this animal for a considerable time from a very short distance, he could not find any resemblance to any animal he had seen before. He describes the head as resembling that of the Elephant, bearing a trunk which swayed about as the creature moved its head. The eyes were about four inches in diameter, and projected about six inches, and were both visible when the back of the head was turned to the spectator. In colour they were dark, with no white about them; the shape of the pupil was not observed. On each side of the head above the eyes there was a small lump, and from the eye to the lower part of the head there was an undulating depression or fold. It appeared to have two pairs of paddles, stated to resemble fig. 4. At irregular intervals a gurgling sound was heard, supposed to proceed from its breathing.

The animal raised its head on the approach of the boat, and swam round looking at the men; it then sank below the surface, and was afterwards seen making off to sea at the rate of about six miles an hour, appearing occasionally at the





SKETCHES OF A MARINE MONSTER SEEN IN MOUNTS BAY.

surface, but the greater portion of its progress was made under water.

The other occupants of the boat confirm Mr. Parsons' observations in all respects. To them the "curl" on each side of the face was a very prominent feature.

For my own part I am inclined to think that the creature was not a vertebrate animal, there being a singular looseness of structure and tendency to a change of form, but it gave the impression of being an air-breather.

At the time that it approached the shore it was low water, and all the boats in the neighbourhood were high and dry, or some attempt would have been made to capture the creature and clear up the mystery connected with it.

[There can be little doubt, from the description and figures, that the creature in question was a gigantic Squid, probably a species of *Architeuthis*, some of which attain a considerable size. In 'The Zoologist' for 1875 (p. 4526), Mr. A. G. More gave an interesting account of a gigantic cephalopod (*Dinoteuthis proboscideus*), which was stranded at Dingle, in Kerry, about two centuries ago, the description of which is contained in a collection of rare tracts relating to Irish history formed by the well-known bookseller, Thomas Thorpe, and now preserved in the Library of the Royal Dublin Society. Referring to this Irish specimen in his 'Manual of Conchology,' Mr. Tryson states (vol. i., p. 32) that Mr. Verill, a good authority, was of opinion that the species was *Architeuthis monachus*, Steenstrup.

Looking at fig. 1, the idea conveyed is that of an animal swimming from right to left, showing considerably more of the body than of the head; and this appears to have been the impression conveyed to the mind of the describer, an impression which would be heightened by the fact that the direction of the creature's course really was from right to left. But we have only to regard the left-hand portion of fig. 1 as the top of the head with projecting eyes, and the right-hand portion as the long tentacles projecting forward on the surface of the water, and bearing in mind that the siphonal action in the Cuttles and Squids causes the creature to travel, as it were, backwards, to have, as it seems to us, an explanation of what was seen by Mr. Millett. We must suppose that what looks like the body in

Mr. Millett's sketch (fig. 1) represents really the two longest tentacles side by side, or perhaps all the tentacles drawn together by the action of the water.

The late Mr. A. W. Lloyd, in a very instructive article on the Ten-footed Cuttle (*Sepia officinalis*), published in 'The Field' of Sept. 2nd, 1876 (p. 280), accompanied by an excellent figure of the species from life, thus describes its movements in the water:—" *Sepia* has great command over its fins. When it wishes to go straight on it undulates them equally on both sides from the front; if it wants to go backwards it does the same thing from behind, and hence the fins are separated posteriorly to enable them to have independent action. If *Sepia* requires to remain still in mid-water the fins are undulated equally from their four corners towards the centre at one time. When it wheels round, the fin on the outer side is undulated more than the one on the inner side of the circle, to an extent varying according to its diameter.* There are several other motions, all of them being, however, compounded of those I have named, and all aided and governed more or less by the jet of water which intermittently issues from the constantly moving funnel. This water enters through an orifice situated just behind and below the creature's eyes, one on each side; and, having aërated the gills below the liver, carrying away in its progress all excrementitious matter, it is by a valvular apparatus, similar to that of a pump, poured out with force through the funnel, which is contracted at its orifice to about one-fourth of its basal area, to give it (the water) more energy as an auxiliary means of locomotion by producing an internal unbalanced pressure, and contrary to the direction of the issuing stream. It is curious that, in all natural-history books I have seen, I have never met with a correct explanation of this siphonal movement of the Cephalopoda. When authors do not avoid explaining it, they put the matter wrongly, by stating that the retropulsion is effected by the issuing water striking against the surrounding water, which of course cannot be, as that water is a yielding substance."

Fig. 2 we must regard as inaccurately representing the top of the head with projecting eyes, the rest of the body and

* The late Mr. Alder saw *Loligo* alive, and described it as swimming forward by fins, and backwards by its funnel.

the tentacles being entirely submerged. In fig. 3 we see a portion of the body with only the top of the head in advance. This would be more correctly drawn if with two strokes of the pencil we were to put a parenthesis () on either side of it, touching it at top and bottom to represent the eyes, and allowing the very faint projections in the centre of each side of the head, as drawn by Mr. Millett, to represent merely the incidence of light upon the eyes. In fig. 4 we see an approximately correct representation of the hinder pointed extremity of a Squid, with a central rib, as Mr. Millett remarks, not unlike the fluke of an anchor; fig. 5 being the same portion of the body seen *edgewise*. It is possible that if these suggestions were applied to other previously described monsters we should have, as in the present case, an explanation of many a so-called "Sea-serpent."—ED.]

NOTES AND QUERIES.

MAMMALIA.

Variety of the Squirrel.—Mr. Corbin's remarks (p. 178) must recall to most of us the grey pelage worn by the Common Squirrel in Northern Europe, and his specimen seems to approximate to the boreal type. Dr. V. Fatio, in his masterly work, 'Faune des Vertèbres de la Suisse,' remarks of the Squirrel that, "grey in the north, it is generally reddish or inclined to black in Central and Southern Europe." He also states that the black form ranges to a greater elevation than the red one, though he adds correctly that these two interbreed, and that black and red young ones are often found in the same nest—a fact that I can personally vouch for. I have never myself met with the black form in England; but, like Mr. Corbin's grey variety, it may very possibly appear from time to time.—H. A. MACPHERSON (50, St. John's Villas, Upper Holloway).

Curious Capture of a Water Rat.—My neighbour, the Rev. J. F. Langford, Vicar of Bere Regis, lately observed that some under-ground depredator was making free with his early peas, just appearing above ground. There seemed to be a sort of tunnel running along underneath the row of peas, and raised here and there like that of a Mole when tunnelling just below the surface. This tunnel was traced to some distance off in the garden, and the gardener, believing the depredator to be a Mole, set an ordinary iron mole-trap in the tunnel in the usual way. The trap being found snapped the next day, on taking it up the surprise was great

at finding that it held, not a Mole but a Water Rat—quite dead, of course. I have never before heard of Water Rats committing depredations of this kind, though of course peas in a germinating state might well be acceptable to these animals; but the difficulty is to account for this individual Rat having got into the garden, which is at least a quarter of a mile from the river, and surrounded completely by a high wall. It is out of the question to suppose that the Rat came by an overland route, but any subterranean method is almost as difficult to conjecture. The Vicarage garden lies, I should say, at least, from seventy to one hundred feet above the level of the river, and even if there were any drainage running between that and the Vicarage, there is no known connection with it in the garden. Perhaps some of your correspondents may be able to throw light upon the subject.—O. P. CAMBRIDGE (Bloxworth, Dorset).

BIRDS.

Birds in the Severe Weather.—During the first week of March I saw what I had not seen before for over forty years, Redwings and Thrushes dying from cold and starvation, and Peewits so tame with hunger that one might easily have knocked them down with a stick. On March 17th I picked up several dead Redwings and Thrushes with scarcely a vestige of flesh upon them. At the same time the frost here, though without intermission since Feb. 21st, was not very severe, excepting on the nights of March 3rd and 16th, on each of which the thermometer, sheltered and with a western aspect, registered 24° Fahr. The ice formed in the night during that period generally disappeared each day, so that there was no skating like that enjoyed in the metropolitan districts. Nor were the dead-leaf-protected woods and ditches frozen up, so that the succumbing of the birds was the more unusual. Redwings and Thrushes, however, rely mainly on berries, of which the supply was exhausted during the spell of frost in January. Some of the roads and lanes here were covered in places with snail-shells, hunted out and brought to the slaughter-stone by the Thrushes, but alas! except in very few instances, uncracked, showing that they were nearly all dead shells, and useless to the starving birds. The only other severe March frost within my own recollection was in the year 1845, when not only did Redwings, Thrushes, and Fieldfares die by scores, but Snipes and Woodcocks came into gardens and ditches in the village, and were in some instances knocked down with sticks and stones. I and my brother shot nine Woodcocks one day, not one of them being worth picking up. Repeatedly, too, during that frost I saw Thrushes and Redwings pounced upon and torn to pieces by Rooks, but without anything to satisfy the hunger of the latter, excepting feathers and bones. I saw also a Great Titmouse fall upon and kill a Golden-crested Wren. The frost lasted in that year until very nearly the end of March, the night of the 18th

or 19th being, I believe, the severest. — O. P. CAMBRIDGE (Bloxworth Rectory, Dorset).

Bittern in Nottinghamshire.—Early in February last I saw, in the shop of Rose, naturalist, Nottingham, a fine male Bittern, which, he told me, had been shot quite close to the town. This is the second that has come under my notice this year. The other was killed in the north of the county. Since writing this note I have received a letter from the Duke of St. Albans informing me that his head keeper saw a Bittern on Feb. 12th beside one of the ponds at Bestwood. — J. WHITAKER (Rainworth Lodge, Mansfield).

Brent Goose and Fork-tailed Petrel near Ringwood.—On the 26th of November last a specimen of this small and sea-loving Goose was killed upon one of the many ponds which are to be found on the extensive heaths of West Hampshire and East Dorset. It is interesting to me as being the first I ever saw from this immediate neighbourhood. On several previous occasions both Canada and Bernacle Geese, and one Egyptian Goose, have been killed in the locality, but I believe all these species are reared upon private waters at no great distance, and the unpinioned birds often make their escape, especially about the time of the spring migration, and, being semi-domesticated, fall an easy prey to the prowling gunners. I do not know, however, that the Brent Goose has ever bred in captivity—at least, in this neighbourhood—so I think the bird in question must be a genuine wild specimen of this usually maritime species. It had been seen several days before it was killed, and evidently the boggy waters of the ponds had not proved so productive of what suited its appetite as the briny sea had done, for it was in a very lean condition when I saw it, and weighed only 1 lb. 9 oz. The Fork-tailed Petrel was caught by a boy on the 9th or 10th of December last, not half a mile from where the Goose was killed. He saw it flying about in a half-dazed state, and, thinking it was a curious Swallow, he caught it, and kept it in cage till it died on Dec. 11th, after refusing all food. Several specimens of the Fork-tailed Petrel were met with near here in December, 1882, which I recorded at the time (*Zool.* 1882, p. 115), but in every case no doubt they were blown inland by stress of weather.—G. B. CORBIN (Ringwood, Hants).

Screaming of the Cock Pheasant.—Although I have shot for nearly thirty years, I never heard a cock Pheasant make this peculiar noise until the other day. Accompanying a friend on February 1st, in order to kill some old cock Pheasants, we were beating a small wood with three spaniels and a retriever. All at once we heard a scream, more like that of a child than anything else. We ran towards the noise just in time to see a fine cock Pheasant sailing away minus his tail and most of the feathers of his

back. We learnt from a beater that one of the spaniels jumped on the bird in a bush, and held it for some time, but it managed to get away before the retriever could get hold of it. We moved it again afterwards, but failed to get a shot. The continuous noise it made when the dog had hold of it was something between the scream of a child and a hare, and, until one knew from whence it proceeded, was quite alarming. Have any readers of 'The Zoologist' had a similar experience?—E. CAMBRIDGE PHILLIPS (Brecon).

Tengmalm's Owl in Yorkshire.—Within the last three years three examples of this rather rare species have occurred near Scarborough, but I regret to state that the exact date was not observed in any instance. The first was taken on board a fishing-smack, and identified by Mr. A. Roberts, of this place. The second was caught by some boys in an old quarry on Oliver's Mount, and kept alive in a cage for nearly two years, when it died, being in bad plumage at the time, and much soiled: it is now preserved by Morley, of Scarborough. The third specimen was trapped on Ayton Moor, about four miles from here, by a gamekeeper about a year ago, and is a good specimen and nicely mounted for Mr. D. Young, of Irton.—R. P. HARPER (Scarborough).

Ornithological Notes from Breconshire.—The snow in February had its usual effect of driving nearly all our feathered visitants to the sea-shore. In November a great number of Golden Plover frequented the various fields about Brecon, but when the snow came there were none to be seen on the open green spaces in the fields that were flushed with water. A very few Peewits remained, but the visitor that attracted most attention was a magnificent Kite, that hovered about the outskirts of Brecon in February for about a fortnight, on several occasions coming into the outlying streets of the town, attracted by the town pigeons, of which there are a good number. My son saw it make a most determined stoop at one of them, but it managed to evade him. To my great relief this Kite escaped the many prowling gunners, and, on the disappearance of the snow, returned to his native moor. Snipes have been scarce with us, and ducks of all descriptions unusually so, that is, near Brecon. Woodcock left us altogether, but the Partridges, judging from the condition of one killed late in January, managed to keep in wonderful order, considering the severe weather. A curiously pied hen Pheasant was also reported to me, but pied Pheasants are nowadays much on the increase.—E. CAMBRIDGE PHILLIPS (Brecon).

Capture of a Cormorant in the City of Dublin.—On the 20th March the keeper of my office in the Custom House asked me to inspect a large bird which he produced. I found it to be a Cormorant, and on examination I could not discover that it had sustained any injury. I learned that it

had been found early that morning by one of the men on his way to work in one of the large areas that surround the building. No one could tell how it came there, but I have no doubt it must have been flying over the city at night, and being dazzled by the glare of the gas-lamps may have struck either against the building or some of the many telephone-wires that cross the roofs of the houses, and losing its balance have fallen into the area, whence it was unable to rise sufficiently high to cross the surrounding railings, and so was easily captured.—J. J. DOWLING (1, Fingal Terrace, Clontarf).

Brent Geese coming Inland.—Brent Geese so rarely leave the coast except to enter the river-mouths, and then do not come up very far, that it may perhaps be of interest to state that on the 13th November last a pair of old Brent Geese were shot on the carrs here. As the crow flies, it is eight miles fully from the sea; and they had been noticed here for a few days previously.—JAMES J. HARRISON (Brandesburton Hall, Hull).

FISHES.

Sexual Characters in the Salmonidæ.—An editorial note in April 'Zoologist' (p. 184) says, "The horny projection of the lower jaw is indicative of sex, and is peculiar to the male." In 1884, when fishing a river in N.W. Rosshire, I killed a Salmon, having most fully developed the "horny projection" referred to, and the same day another Salmon was killed by a friend, also having the said "horny projection." These two fish, on being cut up, were both found to contain well-developed ova, and were undoubtedly female fish. A third friend, who had fished that same river for ten years, said to us that only once before had a similar case come under his notice; and at the time we marvelled very much about it. This is fact. The two first weighed about the same, *viz.*, about 11 lbs.—J. A. HARVIE BROWN (Dunipace House, Larbert, N.B.).

SCIENTIFIC SOCIETIES.

ZOOLOGICAL SOCIETY OF LONDON.

April 6, 1886.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of March, 1886, and called attention to a second specimen of the Rough-billed Pelican of North America, *Pelecanus trachyrhynchus*, purchased March 2nd; and to an example of the White-tailed Ichneumon, *Herpestes albicauda*, from Lamoo, Eastern Africa, presented by Mr. F. J. Jackson, March 4th.

The Secretary exhibited, on behalf of Mr. J. B. Martin, a large tusk of the Indian Elephant, *Elephas indicus*, about six feet long and weighing 100 lbs., stated to have belonged to a "rogue Elephant," with only one tusk, which had been killed at Goruckpore in 1836.

Mr. Selater exhibited the heads and horns of two species of Antelopes obtained in the vicinity of Lamoo, Eastern Africa, belonging respectively to *Strepsiceros imberbis* and *Damalis senegalensis*.

Mr. F. E. Beddard read a paper on some points in the anatomy of *Chauna chavaria*.

Prof. Flower communicated a paper by Miss Agnes Crane on a Brachiopod of the genus *Atretia*, from Port Stephen, Australia, described in MS. by the late Dr. T. Davidson, and proposed to be called *Atretia brazieri*.

Mr. J. G. Goodchild, H.M. Geol. Survey, read a paper on the disposition of the cubital coverts in birds. This communication described the principal modes of imbrication of the cubital coverts, as observed in healthy living birds of all the leading carinate forms, and pointed out that there is a certain correlation between particular styles of imbrication and various other characteristics connected with the pterylosis, the myology, the visceral anatomy and osteology of the birds in question. The paper concluded with some observations upon the origin of the features described.

A communication was read from Dr. Günther, containing some further information on the melanotic variety of the South-African Leopard which he had previously described.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

April 7, 1886.—ROBERT M'LACHLAN, F.R.S., President, in the chair.

The following were elected Fellows of the Society, *viz.*:—Messrs. E. Capron, M.D., J. W. Ellis, L.R.C.P., F. D. Wheeler, M.A., J. B. Bridgman, F.L.S., T. D. Gibson-Carmichael, F.L.S., J. Rhodes, F.R.M.S., A. C. Horner, J. T. Harris, Evan John, Martin Jacoby, J. A. Clark, G. Elisha, and A. Sidney Olliff.

Mr. Crowley exhibited a number of Lepidoptera, including a long series of species belonging to the genus *Rhomalæosoma*, containing many unusual forms, lately received from Accra, West Africa; also, from the same locality, about sixteen species of the genus *Charaxes* in remarkably fine condition, and represented by specimens of both sexes. He also exhibited a number of large specimens of *Saturnia* from Natal, and several unknown species of other genera.

The Rev. W. W. Fowler exhibited four beetles belonging to the family *Carabidæ*. Three of them had been taken twenty years ago on the banks

of the Clyde, and had lately been identified as *Anchomenus Sahlbergi* (Chaud.), a species new to Europe, having hitherto only been found in Siberia. The remaining specimen was *Anchomenus archangelicus* (Sahlb.), a North European species nearly related to *A. Sahlbergi*, but easily distinguishable therefrom by the greater depth of the striæ of the elytra.

Mr. J. W. Slater exhibited, on behalf of Mr. Mutch, a spider belonging to the genus *Galeodes*, and a Lamellicorn beetle belonging to the genus *Cetonia*, which was at first supposed to be a monstrosity, but was afterwards found to owe its unusual appearance to the right elytron having been broken off and fixed on in a reversed position. He also exhibited an undetermined species of a beetle belonging to the family *Curculionidæ*.

Mr. Billups exhibited a specimen of *Bassus bizonarius*, an ichneumon new to Britain, taken at Peckham in May, 1885; also a number of specimens of another parasite, *Dimeris mira* (Ruthe), taken in Headley Lane, Surrey, in March last.

Mr. White exhibited preserved specimens of the larvæ of two species of the genus *Catocala*, for the purpose of calling attention to some remarkable processes on the under side; and Prof. Meldola and Mr. J. Jenner Weir made some observations on them.

Mr. S. Edwards exhibited an unknown exotic spider, found in his orchid house at Blackheath.

Mr. H. Goss exhibited two remarkable varieties of the male of *Argynnis paphia*, taken in Sussex and Hampshire respectively.

Mr. A. G. Butler communicated a paper entitled "Descriptions and remarks upon five new Noctuid Moths from Japan."

The Rev. W. W. Fowler read a paper on "New genera and species of *Languriidæ*," chiefly from specimens in the collections of the British Museum, the Cambridge Museum, Mr. Lewis's Ceylon collection, and the collection of the Rev. H. S. Gorham. In alluding to a species described in this paper, Mr. Champion remarked that he had taken the elongate form, and also the broader form, on trees as well as on low herbage in Central America. Dr. Sharp remarked that Mr. Lewis's experience of the habits of the species in Ceylon appeared to have been different.

Dr. Sharp read a paper "On some proposed transfers of generic names." This paper called attention to a practice advocated by Mons. Des Gozis, which was apparently extending on the Continent, of transferring the names of some of the commonest genera to other genera. The extreme confusion caused by the practice was pointed out, and the author showed briefly that the theory on which Mons. Des Gozis's system was based was as unsound as the practice itself was objectionable. Considerable discussion followed the reading of this paper, in which the Rev. W. W. Fowler, Mr. Waterhouse, Mr. McLachlan, Dr. Sharp, Mr. Pascoe, and Mr. Dunning took part. The last-named gentleman said that the discussion reminded him of a

similar one, on the application of the law of priority to genera, which took place at a meeting of the Society nearly twenty years ago. The project was then condemned as unanimously as that of Mons. Des Gozis had been that evening; and he trusted that entomologists would hear no more of it.—H. Goss, *Secretary*.

NOTICES OF NEW BOOKS.

Rough Notes on the Birds observed during twenty years' shooting and collecting in the British Islands. By E. T. BOOTH. With Plates from drawings by E. Neale. Taken from specimens in the author's possession. Parts VIII. and IX. Folio. London. 1885.

IF we have not of late referred to this excellent work, which continues to appear in parts, it has been from no want of appreciation of its merits. Its chief recommendation lies in the originality of the text, which, instead of being compiled from previous books on the subject, has been written entirely from the author's own observation. As a result, we have not only a freshness of style, but a good deal of information about the haunts and habits of birds of a kind not generally met with in text-books of Ornithology. Mr. Booth's love of the subject has taken him a good deal into some of the wilder parts of Scotland, where he has found opportunity for studying uninterruptedly the life-history of many of the rarer birds whose habits are still but little known, and whose changes of plumage, whether dependent upon age or season, have been hitherto only imperfectly described.

In Part VIII. the species dealt with are Montagu's Harrier (with a plate of the adult female, and another of the nestlings), Greenfinch, Twite, Missel Thrush, Quail, Woodcock (with two plates showing the summer and winter plumage), Jack Snipe, Landrail, Spotted Crake, Brent Goose, Whooper (with a plate showing the immature plumage), Pochard (figured side by side with Paget's Pochard), Goldeneye (with figures of the adult and immature male), and Long-tailed Skua (with figures of the adult in winter and first autumn plumage).

It will be seen that the species are not taken in any systematic order, but are selected apparently at random to give variety. Each chapter, being separately paged, the possessor of the entire

work, when completed, will be enabled to rearrange the pages and plates according to taste, or perhaps according to directions which may be given by the author with the last part.

Mr. Booth has exercised a wise discretion in giving plates of such species only as are most needed. The young of Montagu's Harrier, for example, and the young Whooper are figured for the first time. The former, says Mr. Booth, while still in the down, differ considerably from the young of the Hen Harrier. Shortly after hatching they exhibit a dull white down, which, as they increase in size, assumes a warm red tint. This colour fades after death, but never approaches the dirty white or dull leaden hue which pervades the down on the nestlings of *Circus cyaneus*. Five-and-twenty years ago Mr. Booth procured the eggs of Montagu's Harrier from a nest placed amongst furze near Catsfield, in East Sussex. Since that time he has enjoyed many opportunities of observing this bird in Norfolk, and gives a pleasing description of the nature of its haunts from personal inspection. Such information as he sometimes conveys in a few paragraphs is worth pages of the generalities which one too often meets with in books on British birds, wherein the writers only veil their ignorance of details, which, for want of personal observation, they are unable to give.

Of such a common bird as the Greenfinch, Mr. Booth has some interesting notes to give. He says:—

“While residing in East Lothian I remarked that Greenfinches nested in considerable numbers, often in close proximity to one another, in the thorn hedges surrounding the plantations of beech near the coast of the Firth of Forth. In the South of England this habit of breeding in company may also be observed; in our garden near Brighton the birds were exceedingly plentiful during the summer of 1883, their nests in some instances being placed so thickly that after the autumn gales had carried off the leaves from the shrubs and young trees, at least half a dozen might be counted from one spot. The dense bushes of *Cupressus*, as well as privet, appeared to be selected in preference to other quarters, though willow, poplar, lime, elm, and red may were also well patronised. One exceedingly curious nest (the structure being of nearly twice the usual size), placed at the height of about six feet in a privet bush, attracted my attention, the whole of the foundation being composed of a large mass of the common stonecrop (*Sedum acre*), tore up from a rockery close at hand. This nest, being subsequently dragged out by a cat, the immense quantity of stonecrop used in its construction was plainly exposed to view.”

The name "Mountain Linnet," so often applied to the Twite, *Linota flavirostris*, is, according to Mr. Booth's experience, a misnomer; in no single instance were the barren moorlands on which he met with this bird during the summer at any elevation on the hill-side.

North of the Tweed the Missel Thrush appears to be a very local species. During a residence of a couple of years in East Lothian a few scattered birds of this species were occasionally noticed late in autumn about plantations near the coast; these were regarded as migrants from across the North Sea, working their way towards the south. A pair or two were observed in the densely wooded strath through which the Beaully river runs down towards the coast, and it was also recognised near Dingwall, on the islands at Inverness, and in the neighbourhood of Dunkeld, and a few of the adjacent glens. From the accession to their numbers observed in England during late autumn and early winter, it is evident that a good many must reach our shores from the north of Europe, and in confirmation of this Mr. Booth mentions that he has sometimes had the wings of Missel Thrushes forwarded to him by men on the light-ships off the east coast, taken from birds which had flown on board these vessels.

The nest of the Missel Thrush, as everyone knows, is usually placed at some height in a commanding forest tree. Mr. Booth thus describes a curious departure from this rule:—

"While watching a brood of young Redpolls in the spring of 1878, in a damp alder-car in Ludham, in the east of Norfolk, I detected the nest of a Missel Thrush, built in a small stunted bush within three feet of the ground. I had never previously noticed one at so slight an elevation; and in this instance it could not have been for want of larger timber, as several oaks of fair size were growing over the identical bush in which the nest was placed. This lowly site was probably chosen by the old birds as not so exposed to the attacks of Crows, these depredators being plentiful and unchecked in the district."

According to Mr. Booth's experience, Quail have much decreased in numbers of late years:—

"The bevvies hatched on the fenlands between Newmarket and Cambridge (especially about Bottisham, Qui, and Swaffham), afforded, some five-and-twenty years ago, fair sport at the commencement of the season. What bags were made on the strictly-preserved lands, I had no means of

ascertaining; seven brace, killed by a couple of guns in half a day's shooting on the poor lands or free fens, was the largest number that came to my knowledge. In November, 1860, and again in 1861, I visited repeatedly all the likely ground in this district, but never on any occasion succeeded in obtaining above a brace or two, even after a long day's tramp. The birds were commonly found on oat-stubbles; mustard, however, appeared the cover for which they exhibited an especial preference. Occasionally they were met with in the rough grass and coarse herbage round the skirts of the fens, though seldom penetrating far on to the moist portions of the land."

The details given by Mr. Booth of his personal experience on the subject of Woodcocks carrying their young will be read with interest. The passage is too long to quote in its entirety; we give the conclusion only:—

"Were I to express an opinion as to the manner in which this singular operation is performed (judging from the observations recorded above) it would be that the young one is grasped on rising by the feet of the old bird, which necessarily droop in the first instance; when well on wing the tarsi are raised, bringing the weight nearer to the body, and enabling the bearer to hold a steadier course."

This confirms the view expressed in 'The Zoologist' for 1879, pp. 433—440, where a Woodcock carrying its young, drawn by J. Wolf, is figured (pl. iii.), precisely in the position described by Mr. Booth.

In Part IX. he gives an account of the following species:—Cuckoo, Lark, Hedgesparrow, Dartford Warbler, Wood Pigeon, Turtle Dove, Dotterel (figured), Black-tailed Godwit (figured), Water Rail, Moorhen, Shoveller (with three plates to show the changes of plumage which this species undergoes), Great Crested Grebe (figured in the winter garb), Lesser Black-backed Gull, Great Black-backed Gull (figured in the fifth year's plumage, not then adult), and Fulmar, with a plate, in which both the light and dark forms of this species are represented.

With reference to the wide-spread belief that Cuckoos suck the eggs of other birds, Mr. Booth says:—

"If the Cuckoo is as destructive to eggs as its accusers declare, it appears strange that the depredations of a species so widely distributed have hitherto escaped my observation. I have also great doubts whether the beak of a Cuckoo is sufficiently powerful to break the egg of a pheasant (as has been stated). Many years ago I frequently assisted the keepers in

killing down Jays, Magpies, and Crows during spring in a densely crowded district in the east of Sussex. These robbers were captured in traps baited with the eggs of Thrushes or Pigeons; but, although Cuckoos were exceedingly numerous, not a single bird was taken."

Writing of the Turtle Dove, Mr. Booth says:—

"With the exception of a pair seen flying along the rocks between Cauty Bay and Seacliffe, on the Firth of Forth, early in May, 1864, I never met with the Turtle Dove in Scotland. As far as I was able to ascertain, the bird was unknown to either keepers or gillies, among whom enquiries were made in the Highlands."

One of the most interesting chapters in Part IX. is that wherein the author relates his experiences when searching for Dotterel (*Eudromias morinellus*) on the Perthshire hills. His description also of a certain rush-grown marsh near the sea, the resort of numerous waders and wildfowl (given under the head of "Black-tailed Godwit") ought not to be missed. His accounts, too, of the Shoveller, and of the Greater and Lesser Black-backed Gulls contain a good deal of information not to be found elsewhere, especially in regard to the changes of plumage which these birds undergo before reaching the fully adult plumage.

But those of our readers who are already acquainted with former parts of this work will require no incentive from us to peruse the latest numbers. Its utility, and, as we have said, its originality, sufficiently commend it to all lovers of bird-life.

Since penning these remarks another Part (X.) has appeared, to which we shall hope to refer on some future occasion.

The Code of Nomenclature and Check List of North American Birds. Adopted by THE AMERICAN ORNITHOLOGISTS' UNION. 8vo, pp. 392. New York, 1886.

THE names of the Committee at whose instance this long-expected volume has been prepared are Elliott Coues, J. A. Allen, Robert Ridgway, William Brewster, and H. W. Henshaw. It therefore comes to us "with authority," and its authors may be assured that it will be heartily acceptable to English ornithologists.

It consists of five parts and an index. I. An Introduction of seventeen pages, containing a critical review of the previous

attempts which have been made to construct a code of rules for zoological nomenclature, with a special examination of the Stricklandian code of 1842. II. Principles, Canons, and Recommendations (pp. 18-69), which deserve a more careful perusal and consideration than we have yet had time to bestow before we can venture upon criticism. III. A Check List of North American Birds (pp. 71-347), giving the Scientific and English names, with a brief synonymy and *habitat*, of 768 species. IV. A "Hypothetical List" (pp. 349-357), consisting of species which have been recorded as North American, but whose status as North American birds is doubtful, either from lack of positive evidence of their occurrence within the prescribed limits of the present Check List, or from absence of satisfactory proof of their validity as species; and V. A list of the Fossil Birds of North America, systematically arranged with the genera in alphabetical order, references to original descriptions, and an indication of the localities where found.

This makes a very complete and extremely useful volume; but at the same time it is not without its defects, as, indeed, what book is?

We venture to think that the moth on the title-page must have been invented after the book was completed. If "Zoological Nomenclature be a means, not an end, of Zoological Science," surely it would have been wiser to have made the new code approach the old one wherever practicable instead of diverging as much as possible from it at every opportunity. To conservatives like ourselves it looks as if change for the sake of change had played too conspicuous a part in the decision of the Committee. We must, however, give the authors of the new list the credit of having the courage of their opinions. No devotee of the Stricklandian Code has ever ventured to carry it out to the letter, though more than one British ornithologist has professed to do so. The writers who have attempted to make all the change demanded by the code in question have brought upon themselves such a storm of protest from their ornithological opponents that they have been for the most part glad enough to repudiate the result of their youthful zeal.

As examples of change for the sake of change, we beg to submit the following instances for the recommendation of our friends in America.

The Eastern form of the Bar-tailed Godwit appears under the name of "*Limosa lapponica baueri* (Naum.)" (No. 250). Naumann states that this bird is a long-legged Bar-tailed Godwit from New Holland. No hint is given of any character by which it may be diagnosed from the Western form. Surely this is a *nomen nudum*, and is effectually barred by Canon xxxiv. (p. 49) !

The Gull-billed Tern is called "*Gelochelidon nilotica* (Hasselq.)" (No. 63), but, whilst there cannot be any reasonable doubt that it was this species which Hasselquist discovered in great numbers on the banks of the Nile, one should have thought that such ardent devotees of the new Code of Nomenclature as the A. O. U. profess to be could scarcely have been blind to the obvious meaning of Canons xliii., xlv., and xlv. (pp. 52, 53).

There can scarcely be any doubt that the Slaty-backed Gull, *Larus schistisagus* (No. 48), and the Siberian Gull (*Larus affinis*) (No. 50), are one and the same species.

It would, however, be unfair to pass over the points in which the Committee of the A. O. U. are far in advance of their English pioneers. The existence of sub-species is properly recognised, and the multiplication of genera is, we are happy to say, mitigated by the degradation of many of them to the rank of sub-genera, which do not appear in the nomenclature.

Of the classification adopted we cannot speak very highly. It begins at the end, so to speak, the most highly-developed birds being placed last. The A. O. U. prefer to climb up the genealogical tree, instead of descending like a bird upon the topmost branch, as the Committee of the B. O. U. have attempted to do. We fully recognise the impossibility of forming a linear arrangement of birds. Such a course involves a choice of evils, but to interpose the Ducks (*Anseres*) and the Herons (*Herodiones*) between such universally recognised allies as the Gulls (*Longipennes*) and the Waders (*Limicolæ*) is surely a deliberate choice of evil that might have been avoided.

On the whole, however, the book deserves great praise. Its faults, if we may term them such, are apparently not the result of carelessness, but of deliberation,—in other words, errors of judgment,—and as such pardonable.



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ON THE PHEASANT OF ST. HELENA.

BY HENRY SEEBOHM.

VISITORS to the Indian and Colonial Exhibition may see, in the small court allotted to the Island of St. Helena, a series of Pheasants from that isolated dependency of the British Crown. These Pheasants belong to the species described by Gmelin as *Phasianus torquatus*, one of the many species to which Gmelin gave a Latin name in his edition of the 'Systema Natura' of Linnæus, published in 1788, from descriptions borrowed from Latham's 'General Synopsis of Birds,' published in volumes from 1781 to 1785. This species, commonly called the Chinese Ring-necked Pheasant, has been introduced into England, and has interbred with the previously introduced Colchican Pheasant, *Phasianus colchicus*, to such an extent that it is almost impossible to obtain examples in this country that are not mongrels between the two species [or between these and the Japanese *Phasianus versicolor*.—ED.]. In addition to the white ring round the neck, one of the most conspicuous differences between the two first-named species is to be found in the predominant colour of the lower back, which is blue-grey or lavender-colour in the Chinese species, and chestnut-red in the Persian bird. It is a remarkable fact that the various species of Pheasants, all closely allied to our bird, which inhabit the semi-tropical regions of Asia from Turkey to China, are divided into two groups by the meridian of Calcutta, those to the west of that line having red lower backs,

and those to the east of it having blue lower backs. On both sides of the line are species with white collars and species without white collars, but Latham confounded the eastern white-collared species with the western ones. The great Russian traveller, Pallas, was the first ornithologist to distinguish the latter by the name of *Phasianus mongolicus*. Both writers regarded them as only varieties of the Common Pheasant, a theory confirmed by the curious fact that they freely interbreed with each other, and produce a fertile progeny.

Latham remarks of his Ring Pheasant that it is "pretty common at St. Helena"; but its true habitat is Eastern Asia. The Chinese Ring-necked Pheasant is a resident in the valley of the Amoor in South-Eastern Siberia, in China, and in Eastern Mongolia and Thibet. There seems to be some historical evidence that it was introduced on the Island of St. Helena by the Portuguese in 1513.* Latham (Gen. Syn., vol. ii., part ii., p. 715, note), says, on the authority of Forster, "introduced by the Governor," but without mentioning the precise date. It was probably, however, not very long after the discovery of the island, for Capt. Cavendish, who visited St. Helena in June, 1588, and spent twelve days there, found that Pheasants were then abundant there. He says:—"There are likewise no less plenty of Pheasants in the island, which are also very big and fat."†

At the present time, according to Mr. Melliss ('St. Helena,' 1875, p. 94), "they exist abundantly, inhabiting the interior of the island, and quite maintain the characteristics mentioned by Cavendish. They are protected by game-laws, which permit them to be killed on payment of the license for six weeks in the summer or autumn of each year; and hundreds of them are generally killed during one shooting season. They find plenty of covert, and generally make their nests in the long tufty fields of cow-grass (*Paspalum scrobiculatum*)."

After having been thus isolated from the parent stock for 373 years, in a very different climate from that of South Siberia,

* "The island first got its name from the Portuguese, who discovered it in the year 1501, on St. Helen's-day."—Osbeck, 'Voyage,' vol. ii. p. 76. According to other authorities the date of its discovery was May 21st, 1502.

† 'Callander's Voyages,' vol. i. p. 424 (1776).

and doubtless having been fed for that length of time on somewhat different food, one might expect to find that they had become to some extent differentiated from the original form.

By the kindness of Col. Edmund Palmer I have had an opportunity of comparing the series of St. Helena Pheasants with a series of the same species from Siberia, China, the Corea, and Formosa. The Pheasant inhabiting the last-named island is so much paler in the ground colour of the upper back and flanks that Mr. Elliot described it as a distinct species under the name of *Phasianus formosanus* (Proc. Zool. Soc. 1870, p. 406). There is, however, no doubt that it can only claim to be subspecifically distinct, as examples from the Corea are intermediate in colour. The St. Helena birds, though they have also enjoyed the advantages, or disadvantages, of island life for so many centuries, have retained the typical colour, and, after a careful examination, the only difference that I have been able to discover between them and Siberian examples is so slight that it might almost escape detection. In the Siberian Pheasant the feathers which form the white ring round the neck have narrow black margins on the nape. In the St. Helena Pheasant these black margins are not quite so narrow, and are also more or less distinctly traceable on the white feathers of the sides and front of the neck, as well as on the nape.

This interesting fact must not be regarded as tending in any way to lessen our estimate of the importance of isolation in producing differentiation. Strictly speaking isolation does *not* directly produce differentiation. Logically stated, the facts are these: individual variation is produced by a variety of causes, change of climate, change of food, change of habits, the action of the two former being probably direct, and principally affecting colour, that of the latter being indirect and affecting the structure of the various organs, whilst they are in a more or less plastic condition between the birth and arrival at maturity of the animal, the organs being developed by use or degraded by disuse. These variations are hereditary, and the part that isolation plays is that of preventing interbreeding from obstructing the action of Natural Selection in causing the rapid accumulation or continuation of the variations which are advantageous to the species. The inference to be drawn is that in the life of even so variable a bird as a Pheasant, and even

under conditions apparently so favourable to differentiation as those of the complete isolation of a Siberian bird on an oceanic island in the tropics, three centuries and a half is too short a time to have produced any important differentiation.

[It is difficult to reconcile the statement of Cavendish with that of G. Forster, quoted by Latham (*ut supra*), because, although no date is mentioned, Forster's words certainly imply that Pheasants were introduced into St. Helena by the Governor of the island (Mr. Skottoe) who entertained him in 1775. In his 'Voyage round the World in H.M. Sloop "Resolution," commanded by Capt. Cook, during the years 1772, -3, -4, and -5' (2 vols. 4to, 1777), we find (vol. ii. p. 567) that the ship reached St. Helena on the 16th May, 1775, and on the following day Forster, in company with Capt. Cook and the Hon. Mr. Stuart, "took an airing on the hills." On May 18th they revisited the hills, and "in our return," he says, "we saw several coveys of Partridges, which are of the small red-legged sort common on the coast of Africa. We likewise saw several beautiful Ring Pheasants, which have been introduced into the island by the Governor, together with Guinea-hens and Rabbits. There is at present a penalty of five pounds for killing a Pheasant, by which means they multiply so fast that the restriction will soon be needless." We must therefore conclude either that Cavendish in 1588 mistook some other birds for Pheasants, which seems hardly possible, or that Forster in 1775 was mistaken in supposing that Pheasants were introduced into the island *for the first time* by the Governor who entertained him, Mr. Skottoe.—ED.]

ON THE MOULTING OF THE FLIGHT-FEATHERS IN THE COMMON WILD DUCK.

BY THE EDITOR.

A SUBJECT of some interest to naturalists and sportsmen is the different mode in which the moulting of the quill-feathers is effected in the sexes of the Common Wild Duck, *Anas boscas*; and yet it is curious how few persons, comparatively speaking, are aware of it, although the facts have long been made known.

Nearly fifty years ago Charles Waterton made some experiments on the subject by keeping wild ducks in confinement between the months of May and November, and watching them attentively during their moult. The results of his observation were embodied in an article "on the habits of the Mallard," published in the first series of his 'Essays on Natural History' (pp. 196—202). From this article we make the following extract:—

"At the close of the breeding season the drake undergoes a very remarkable change of plumage: on viewing it all speculation on the part of the ornithologist is utterly confounded; for there is not the smallest clue afforded him by which he may be enabled to trace out the cause of the strange phenomenon. The drake, for a very short period of the year, is so completely clothed in the raiment of the female that it requires a keen and penetrating eye to distinguish the one from the other. About the 24th of May the breast and back of the drake exhibit the first appearance of a change of colour. In a few days after this the curled feathers above the tail drop out, the grey feathers begin to appear amongst the lovely green plumage which surrounds the eyes. Every succeeding day now brings marks of rapid change. By the 23rd of June scarcely one single green feather is to be seen on the head and neck of the bird. By the 6th of July every feather of the former brilliant plumage has made its disappearance, and the male has received a garb like that of the female, though of a somewhat darker tint. In the early part of August this new plumage begins to change gradually, and by the 10th of October the drake will appear again in all his rich magnificence of dress, than which scarcely anything throughout the whole wide field of nature can be seen more lovely, or better arranged to charm the eye of man. This description of the change of plumage in the Mallard has been penned down with great care. I enclosed two male birds in a coop from the middle of May to the middle of October, and saw them every day during the whole of their captivity. Perhaps the moulting in other individuals may vary a trifle with regard to time. Thus we may say that once every year, for a very short period, the drake goes, as it were, into an eclipse; so that, from the early part of the month of July to about the first week in August, neither in the poultry-yards of civilised man, nor through the vast expanse of Nature's wildest range, can there be found a drake in that plumage which, at all other seasons of the year, is so remarkably splendid and diversified."

These observations of Waterton seem not only to have escaped the attention of most English sportsmen, but to have been overlooked also by a well-known French naturalist, Baron

d'Hamonville, who for some years past has been engaged in making observations of his own on the subject, and who not long since published the result of his investigations in the 'Bulletin de la Société Zoologique de France' (vol. ix., pp. 101—106). As probably few of our readers may have an opportunity of consulting this essay, we have thought it worth while to translate the most important portion of it relating to the moulting of Wild Ducks, not omitting certain other observations on the habits of these birds at different seasons of the year, which are worth perusal, as coming from the pen of an accomplished sportsman and naturalist.

Passing over some generalities, and a reference to a paper by M. Gerbe, published in the 'Revue et Magasin de Zoologie' (1875, pp. 271—277), on the mode in which the flight-feathers are moulted in certain Puffins and Divers, we come to the following sentence, which contains the sum and substance of the observations which are subsequently detailed:—"While the male of *Anas boscas* loses the power of flight with the loss of his primaries, the female Wild Duck moults gradually, like the majority of birds, without being deprived for a moment of the use of her wings."

These facts, says Baron d'Hamonville, have long been known to us, but we were anxious to study them more attentively before making them public. We believe we are now in a position to do so. The Wild Ducks, which take up their abode on our pools in separate families till the beginning of autumn, collect at that season in large flocks of several hundreds, without ever mingling either with others of their own species which arrive on their migration, or with any of the numerous other wildfowl which about the same time visit our waters to seek food and shelter. When the hard frosts of winter supervene, and the pools are entirely frozen over, our native ducks do not leave them, but congregate in the middle, though every evening at dusk they take flight to the streams, where the less frigid water furnishes them with an abundant supply of cress and other aquatic plants. But, alas! at the very place where they seek life they not unfrequently meet with death, for the sportsman who knows their habits lies in wait there to shoot them at flight-time. In hard winters, when the ice completely invades their domain and they are temporarily forced to abandon it, they betake themselves

to running water, until at the first appearance of thaw they return at once to their accustomed haunt, which they do not quit for the rest of the year.

Early in March, especially if the weather be open, the birds begin to pair, and visit the ponds to select the favoured spot which is to shelter their young. Formerly they used to make their nests amongst the tufted reeds by the small pools in the forest adjoining the larger meres, but since collectors have made such a raid upon them, they have modified their habits, and taken to building on the edge of the water, where the surrounding growth is thickest, especially amongst thorns and willows.

Towards the end of April, if we row about these meres in a boat, instead of putting up a pair of Wild Ducks now and then, we only see the Mallard, since the female, having finished laying her full complement of ten or a dozen eggs, is now sitting.

Incubation lasts twenty-eight days, the earliest young birds being hatched out about the middle of May, and all hatching being over by the middle of June, except in the case of second broods, which may be seen as late as July 10th or 15th.

The Wild Duck is an excellent mother, never deserting her brood, and when she takes them insect-catching, to which they are much addicted, if it happens that she is suddenly surprised by an intruder, she leaves no *ruse* untried to deceive him, just like the Partridge of old Lafontaine. You should see her then fluttering and limping along as if badly wounded, to mislead the intruder and draw him away from the ducklings. The latter, moreover, warned by a note of alarm from their mother, lie hidden in the grass, and never stir until she returns to let them know that the danger has passed.

Meanwhile, the time of moulting is at hand, for the Mallard that we saw flying about by himself until about the middle of June we have since lost sight of. His fine spring plumage has given place to a more sombre livery, in which all the feathers with metallic reflections have disappeared. The flight-feathers, both primaries and secondaries, have been suddenly shed, leaving the wing quite bare, and its owner absolutely incapable of taking flight. From the 1st to the 15th July, when wildfowl shooting commences in our district (Meurthe et Moselle), there is not a single Mallard to be found in flying order, and sportsmen then give them the characteristic

name of *Désailés*. It is this circumstance no doubt which has given rise to the popular impression that at this season of the year the Mallards migrate, leaving the Ducks behind. By this time, also, the young birds have attained some size, and are known as "*Halbrans*." Some are already on the wing and following their parent, others impatiently await the appearance of their flight-feathers, which sprout all at once, to enable them in their turn to try their powers of flight.

These "*Halbrans*" remain in company till the autumn, when they unite in large flocks, as already mentioned. At the opening of the shooting season they are easily shot, and get up sometimes at the feet of the shooter, or under the boat which carries him, like young Partridges in September; but they soon acquire experience, and rarely suffer a near approach, unless suddenly surprised. The old "*Désailés*," although deprived of the use of their wings, take good care of themselves, either threading their way noiselessly through the reeds, or diving across the open reaches of water; they have a wonderful knack of eluding pursuit. If they are driven towards the tail end of a pool, where the cover is thinner, away from the great reed beds, their usual haunt, they know the danger of turning back past the shooters, and resort to another dodge to escape. Diving quietly towards any water-plants on the surface, they come up under a leaf, where, with only the top of the head above water, they remain perfectly motionless, eyeing the sportsman who is in search of them. The latter, who is on his guard against such wiles, scrutinises every bunch of floating cover, detects the skulking Mallard, approaches noiselessly, and grasps him by the neck, unless he prefers to shoot him; but very often, nine times out of ten, the *ruse* succeeds, and the bird escapes. In this way, too, many a winged bird which has dropped in the water has eluded discovery, to the vexation of the shooter.

Towards the end of July the old Mallards have got new quills and recovered the use of their wings, a few only being delayed until about the 10th or 15th August. But by this date all trace of the moult has completely disappeared.

For the last twenty years or more, twenty-five or thirty of these flightless Mallards have annually passed through our hands. We have always carefully examined them, and whenever (from their peculiar dull plumage) there has been any doubt about the

sex, which has not often happened, we have ascertained it by dissection. Now in all this number of birds we have never found a single female. Some had the wings completely deprived of the primaries and secondaries, showing without doubt that they had all been moulted at once; others had their digital and metacarpal feathers (the primaries) emerging from their sheaths, whilst the cubital feathers (or secondaries) were only just beginning to show, indicating that the primaries had been shed only a very short time before the secondaries; but this difference was unimportant, since in each case the birds were perfectly incapable of flight. On the other hand, all the females which were obtained at the same season had the wings irregularly furnished with quill-feathers, some of the natural length, others a little shorter, others again entirely wanting, but never to such an extent as to prevent the bird from flying.

From these observations it is clear that in the case of our native wild ducks the quill-feathers are moulted all at once in the Mallards (depriving them for the time being of the use of their wings), whilst in the females the moult is so gradual that the capacity for flight is never impaired. This moult, so differently effected in the two sexes of the same species, takes place not without reason.

The Mallard does not trouble himself about the brood, whilst the female taking the entire charge of them has need of all her resources for the purpose. Hence Nature has been less exacting with her than with her mate.

NOTES ON THE VERTEBRATE ANIMALS OF LEICESTERSHIRE.

By MONTAGU BROWNE, F.Z.S.
Curator, Town Museum, Leicester.

(Continued from p. 202).

Order COLUMBÆ.—Family COLUMBIDÆ.

Columba palumbus, Linn. Ring Dove (Wood Pigeon).—Resident; generally distributed. In the crop of a Wood Pigeon presented to the Museum by Mr. Bernard Ellis in 1882, sixty-one acorns were found.

Columba œnas, Linn. Stock Dove ("Blue Rock," by error).—Resident; generally distributed. Potter, in his 'History of Charnwood Forest,' says, "Mr. Grundy has shot 'Rock Doves' at Bardon many years back, which he thought came from the Vale of Belvoir. These were probably not *C. livia*, but *C. œnas*, which, as I learn from Mr. Bloxam, is still common in Bradgate Park." It is as numerous in summer as the Ring Dove, breeding in holes in trees. I have seen it nesting at Knighton, whence young birds were procured for the Leicester Museum.

Turtur communis, Selby. Turtle Dove.—A summer visitant, not common, and breeding sparingly. Harley remarks upon its comparative rarity in the county. In May, 1881, I saw a pair in the rectory garden at Aylestone, evidently engaged in nidification.

Ectopistes migratorius (Linn.). Passenger Pigeon.—Widdowson wrote, "One killed in Scalford village street some years ago. The same year I saw accounts of several killed near Liverpool." [Probably imported birds which escaped from some dealer, or from the docks.—ED.]

Order GALLINÆ.—Family PHASIANIDÆ.

Phasianus colchicus, Linn. Pheasant.—Commonly distributed, resident; subject to much variety. Potter, in his 'History of Charnwood Forest,' says, "Hybrids between Pheasant and Fowl occasionally occur in Birchwood near Charley." Lord Ferrers has at Staunton two hybrids between Pheasant and Grey Hen. They were bred in South Wood, and strayed into one of the Staunton woods, where the keeper shot them. Sir Arthur Hazlerigg shot at Noseley, some years since, a pure white variety, which I have, by his permission, examined.

Caccabis rufa (Linn.). Red-legged Partridge.—Sparingly distributed and breeding.

Caccabis petrosa (Gmelin). Barbary Partridge.—In April, 1842, a specimen of this Partridge was picked up dead at Edmondthorpe, near Melton Mowbray: see Yarrell's Hist. Brit. Birds, 4th ed. (vol. iii. p. 121). Widdowson wrote me that he had this very specimen in his possession, and it was from this bird that Yarrell's figure of the species was taken.

Perdix cinerea, Latham. Common Partridge.—Resident; generally distributed and common. The Rev. Churchill Babington,

in Potter's 'History of Charnwood Forest,' states on the authority of Mr. C. March Phillipps, that a variety with white horse-shoe markings occurred on Charnwood. Mr. T. Woodcock, of Ratcliffe-on-the-Wreake, wrote me on Sept. 3rd, 1885, that there were three white Partridges, in a covey of nine or ten, on the Garthorpe estate, near Melton Mowbray. I saw a curious light sandy variety, in the possession of Sir Arthur Hazlerigg, shot at Noseley some years ago. The 'Leicester Daily Post' recorded that just after the great storm of the 18th and 19th January, 1881, a bricklayer captured a Partridge in a hole of the damaged roof of a house in Lower Bond Street, Leicester. A still more curious circumstance is recorded by Mr. Davenport, who wrote Dec. 11th, 1885, "I know of a covey of seven cocks and one hen reared this summer under a hen fowl on Mr. G. V. Braithwaite's estate at Stackley, which now come out of the fields to a whistle, and are so tame as to perch on the shoulders and feed out of the hands of the lady of the house." Writing again on Feb. 1st, 1886, he says, "Those Partridges, reduced by one cock, come every morning to be fed, just as they did in September—a marvellous sight."

Coturnix communis, Bonnaterre. Quail.—A rare summer visitant. The Rev. Churchill Babington (see Potter) says, "Several killed one season between Whitwick and Bardon, some years ago, by Mr. Grundy, who kept a wounded bird alive for some time." Harley says, "The Quail's visits are irregular and uncertain, and it appears to be confined to meadow-lands and fields contiguous to streams. On the banks of the Soar and its meadows the Quail breeds in small numbers. Cossington, Barrow, Sileby, Thurcaston, and some other villages having low wet meadows adjoining thereunto, are yearly visited." On the evening of November 15th, 1846, a Quail was captured in the market-place, Leicester. A second example was shot on Mr. Winstanley's estate at Braunstone, on the 20th November, of the same year. Quails have been met with and shot at Tilton, and in the Vale of Belvoir, where Mr. Ingram thinks it occasionally breeds, as he has shot immature birds there with others; near Melton Mowbray, and not far from Leicester. The Earl of Gainsborough, who has most obligingly given me his notes on the fauna of Rutland for incorporation in this list, tells me that he has shot a few Quails at Exton Park, and that this bird has also occurred at Whitwell, Burley-on-the-Hill, Thistleton, and Ayston.

Family TETRAONIDÆ.

Lagopus scoticus (Latham). Red Grouse.—Formerly occurred, not now found in the county. The Rev. Churchill Babington (see Potter) says, “A brood at Tin Meadows, twenty years ago, some of which were shot by Mr. Grundy, when in search of Black Game. Since then Mr. Gisborne attempted to introduce the bird from Scotland and the Derbyshire Moors, but without success, it being unable to bear the dust of the journey, as the gamekeeper thought.” The Rev. J. C. Davenport shot one at Skeffington in the winter of 1860, while feeding on some hips on a hedge. I saw a mounted specimen at Noseley, which had been shot there some years ago, whilst sitting on a whitethorn eating the haws, by Sir Arthur Hazlerigg; it had been previously observed sitting on the top of a large ash tree!

Tetrao tetrix, Linn. Black Grouse.—No longer met with in the county. The Rev. Churchill Babington, writing in Potter’s ‘Charnwood Forest,’ refers to it as formerly occurring in Charnwood Heath, Sharpley, &c., in tolerable numbers, but then nearly extinct. Harley also met with it in Charnwood Forest, where it used to breed annually, though in diminished numbers, since the ancient forest existed only in small patches of a few hundred acres in extent, consequently the range of the Black Grouse was considerably narrowed. On the flanks of the wild hills outlying the lordship of Whitwick there remained a few birds still protected. He appears to have last seen it in the spring of 1850. The late Mr. Alfred Ellis, in his ‘Notes about Birds,’ published for private circulation in 1868, wrote that “some years since” he had shot several, with Mr. Gisborne, near to the Monastery on the Forest. Mr. J. B. Ellis writes, “Now extinct; used to live in large woods by Benscliff.” Sir G. Beaumont wrote to Mr. Macaulay that he remembered killing Black Game on Charnwood Forest about 1847 or 1848, and during the next ten years he shot several “Grey Hens” in South Wood, near Coleorton. Lord Gainsborough writes that Mr. G. H. Finch, of Burley-on-the-Hill, recollects a “Grey Hen” being shot in Burley Wood in November, 1856.

Order FULICARIÆ.—Family RALLIDÆ.

Rallus aquaticus, Linn. Water Rail.—Generally distributed, and probably breeding. The Rev. Churchill Babington (see

Potter) says it occurs at Thringstone, Rothley Temple, &c. I have seen several local specimens. Mr. Macaulay, I believe, has shot it at Saddington, and Mr. Samuel Bevans shot a specimen in the Abbey Meadow some years ago, which I saw.

Porzana maruetta (Leach). Spotted Crake.—Sparingly distributed, probably breeding. According to Harley, it was very common during the summer of 1842. In many localities throughout the Midlands it appeared in numbers, but nowhere in Leicestershire was it met with in greater abundance than in the meadows and fields near the Soar. From Loughborough to Kegworth it was plentiful. Prior to the taking over of the Museum by the Corporation in 1849, there appears to have been a specimen from “meadows on banks of River Soar.” Mr. Macaulay (Mid. Nat. 1882, p. 78) “has killed three in his neighbourhood during the last twenty years,” and he wrote me that he had shot another at Saddington Reservoir, on the 15th January, 1884. I saw two mounted specimens which had been shot, at the Abbey Meadow some seven or eight years ago, by Mr. Samuel Bevans. One purchased from Mr. R. Widdowson for the Museum was obtained at Melton Mowbray, on the 1st October, 1881, and he also wrote me that it bred in that locality. I saw one, in the possession of Turner, shot in the Abbey Meadow, three years ago, and another, in the possession of Elkington, caught by a dog at Birstall, on the 17th of October, 1885.

Porzana parva (Scopoli). Little Crake.—Harley states that one was shot near the town of Leicester in January, 1841, and was afterwards eaten.

Crex pratensis, Bechstein. Corn Crake (Landrail).—A summer migrant; generally distributed, and breeding.

Gallinula chloropus (Linn.). Moorhen (Waterhen).—Resident, and generally distributed. Breeding quite close to Leicester, and at Aylestone. Often flying at night with loud cries. The MS. donation book Leicester Town Museum records, under date 23rd Feb. 1853, one presented by Mr. Dalby, shot at Ilston-on-the-Hill as being “remarkable for being destitute of the slightest vestige of the hinder toes.”

Fulica atra, Linn. Coot (“Bald Coot”).—Resident, and locally distributed. Breeds at Bosworth, Groby Pool, Saddington Reservoir, “Frog-hollow” Pond, Belvoir. One was shot close

to Leicester, at Belgrave by Mr. Grewcock during a snow-storm on January 23rd, 1886.

Order ALECTORIDES.—Family GRUIDÆ.

Grus communis, Bechstein. Crane.—In 1822, according to Harley, a Crane was shot by Mr. Chaplin, of Groby, on the banks of Groby Pool. This is the only instance in which it is known to have occurred in this county.

(To be continued.)

NOTES AND QUERIES.

The Sale of Game out of Season.—Many persons seem to be under the impression that no penalty is incurred by selling game out of season, provided it can be proved to have been obtained *from abroad*. This is altogether a mistake; such a proviso extends only to wildfowl, and no such clause is to be found in the principal Game Act of 1 and 2 Will. IV. c. 32. Section 4 of that Act is explicit enough. It enacts that “anyone who shall expose or offer for sale *any* game bird after the lapse of ten days from the expiration of the shooting season (that is after the 11th February) shall be liable, on conviction, to a penalty not exceeding £1 for every bird so exposed or offered for sale,” no exception being made in favour of foreign game. “*Any game bird*,” of course, means any bird which is included in the definition of game laid down in the Act referred to, irrespective of locality, and all our native game birds being protected by that statute it was of course unnecessary to include them (and they accordingly are not included) in the provisions either of the Wild Fowl Preservation Act or the Wild Birds Protection Act. The sooner this is understood by London and provincial game-dealers the better for the interests of game-preservers and sportsmen generally throughout the kingdom.

Death of Thomas Edward, the Banffshire Naturalist.—Our readers will be sorry to hear of the death of this worthy naturalist, who has just passed away at the advanced age of seventy-two. A shoemaker by trade at Banff, and a poor man, he had not the means to inform himself as others with similar tastes have done. He always lamented his want of books, and in the course of his collecting had frequently to send his specimens to correspondents at a distance to be named, and in this way often lost them. Being resident at Banff, his rambles extended coastwise along the shore of the Moray Firth for about seven miles in one direction and six in another. These excursions also extended inland for about five or six miles. The use

which he made of his time may be judged from the result of these excursions. His accumulation of natural objects became something extraordinary. In eight years he had preserved nearly 2000 specimens of living creatures collected in the neighbourhood of Banff—quadrupeds, birds, reptiles, fishes, crustacea, corals, sponges, and other objects, to say nothing of a large collection of carefully dried plants, the whole of which he learnt to mount and preserve himself. It is lamentable to think that these collections were subsequently lost when, quitting Banff for Aberdeen in the hope of bettering his position, Edward opened a museum, which did not pay its expenses, and the collections had to be sold at a great sacrifice, the greater portion subsequently perishing for want of proper care. But although the collection had gone, the knowledge gained in forming it had been well stored, and through the kindness of his friend the Rev. Mr. Smith, of Monquhitter, Edward was enabled to impart much useful information to other naturalists. In Bate and Westwood's 'History of British Sessile-eyed Crustacea,' his services are frequently acknowledged. Of the Crustacea mentioned in that work Edward collected no less than 127 species in the Moray Firth, of which twenty were new to Science. Many of his beetles and other insects were forwarded for identification to Edward Newman, who named them for him, and assisted him liberally with books that were likely to be useful to him. The late Mr. Couch, in the preparation of his work on 'British Fishes,' found Edward a most useful correspondent, for through his agency several species of fish were procured on the Banffshire coast which were not previously known to occur there. Just ten years ago Mr. Smiles published his life of this Scotch Naturalist, a work which was reviewed at the time in these pages (Zool. 1877, pp. 71—76), and which doubtless everyone with a taste for Natural History has read. It was gratifying to learn that the publication of his biography placed Edward in receipt of a royal pension of £50 per annum, and led to a public recognition of his genius by the presentation to him at Aberdeen of a purse containing £333. But he himself must surely have felt how much more useful would this have been had it come to him in the prime of life instead of in his old age.

A Median Eye in Vertebrates.—A most interesting discovery has been made of a kind totally unexpected, and of fundamental importance. Dr. von Graaf, having reported the presence of an eye-like organ in the Slowworm (*Anguis fragilis*), Mr. W. Baldwin Spencer, M.A. (Assistant to Professor Moseley at Oxford, and lately elected to a fellowship at Lincoln College, Oxford), has examined a similar structure in *Hatteria*, and some other Lizards. He has discovered the nerve by means of which the median interparietal eye is connected with the brain, and finds that it is a portion of the *epiphysis cerebri* (pineal gland). The eye does not reach the surface, is surrounded with connective-tissue, has a distinct lens, and is

on the "invertebrate type,"—that is to say, the rods are turned towards, and not away from, the light, as they are in the lateral eyes of vertebrates.

MAMMALIA.

Martens in Herefordshire.—I promised to let you know the history of the Herefordshire Marten-cat which was presented to the British Museum last year, and at the same time to try and furnish some information about other specimens of this now rare animal procured in this county. The specimen in the British Museum (dark brown with maize-coloured throat) was caught in a vermin-trap in a covert called "Paradise-brake," close to the house, in March, 1878. The keeper (Edwin Rogers) who caught it called it a Pine Weasel, and reported that he came upon the foot-prints of another soon afterwards; but has not seen or heard of one from that time to the present. Mr. H. Wood, of White House, Vowchurch, Hereford, has a stuffed specimen of the Marten, which he informs me was caught by his keeper, Thomas Howard, in Lowerhouse Wood, in the parish of St. Margaret's, about twenty-five years ago. Its colour is a light brown, with a white throat, but it is said to have been darker when killed, and to have since faded, either from exposure to the light or from the action of the chemicals used for preserving the skin. Mr. Wood remembers to have seen another Marten, which was killed in the orchard above his house perhaps thirty-five years ago. This specimen was much darker in colour than the one now in his possession. It was preserved at the time, but was subsequently given away, and he is now uncertain whether the specimen is still in existence or not. He adds that "many years ago" a yellow-throated Marten was killed near Urishay Castle, about three miles from where he resides, and was described at the time in the Hereford papers as a "Pine Marten." Mr. Greathead, of Whitfield, near St. Devereux, about four miles from here, informs me that about the year 1860 three Martens were killed in this neighbourhood, and that none have been seen since. The old keeper who killed them described them as very like young fox-cubs, and, in regard to size, intermediate between a fox and a "fitchew," or Polecat. The Rev. G. M. Watkins informs me that Whitlock, the keeper at Kentchurch Court, says he has not seen a "Marten-cat" for twenty years; not since 1866, when one was trapped at Kentchurch, just by the little brook that runs into the River Monnow. His father, forty years ago, used to kill four or five every year near Monmouth, in a large wood called "Whitehill." The last I have heard of was seen just two years ago. In the spring of 1884, Mr. Walter Steward, R.N., was wading in the River Dore, when he saw a Marten (exactly like the one we sent to the Museum, dark brown with yellow throat) crossing the stream by means of a tree which had fallen across, and carrying a rat in its mouth. Mr. Steward, being in the water not far from the tree, had a

very distinct view of the animal. We never heard of its being caught or killed. This is all the information I have been able to obtain about Martens in Herefordshire.—F. ATTWOOD-MATHEWS (Pontrilas Court, Hereford).

The past Winter and the Rabbits.—The protracted severity of the late winter has sadly punished the Rabbits in this district. Young ones were seen early in January, as is usually the case, but none appear to have survived. The second litter met with what I consider an unusual fate, for during March scores of newly-born young were found on the snow, in most cases dropped singly; in others four or five were laid together, but in no instance had the doe attempted to make a nest. Thus the first two litters perished, and at the present time—middle of May—instead of there being a good stock of half-grown young, only a very few, about a month old, can be seen. The old bucks appear to have fared better than the does, at any rate, the number of the former is about double that of the latter, as we have found when catching a few to turn down in some of the cloughs on the borders of the moors, where the snow was so deep, and lay for such a length of time, that almost every Rabbit died in the burrows.—ROBERT J. HOWARD (Blackburn).

Destruction of young Rabbits by Rats.—Some of your readers have, I dare say, in the course of their summer walks, occasionally come across young Rabbits, dead or only wounded, with their hind-quarters paralysed from the effect of a deep incised wound at each side of their loins just before the hip-joints. Having frequently found young Rabbits in that state I for a long time felt greatly puzzled as to what animal attacked and wounded them: and what puzzled me more was the fact that, often hearing young Rabbits screaming under bushes and briers, yet when I hurried up to the bush the screaming always ceased—no enemy was in view, though the disabled Rabbit remained in a helpless state. This state of things continued for some time, until one day I heard a young Rabbit screaming under some briers, and on approaching cautiously without noise I saw a great Rat at the mouth of a hole, having hold of a young Rabbit across the loins, trying to drag it back into the hole; but on seeing me the Rat retreated into the hole, leaving the unfortunate Rabbit in such a helpless state that I was obliged to kill it to put an end to its sufferings. This solved the puzzle as to what animal was attacking the Rabbits, and since then I have frequently rescued young Rabbits from the Rats, and have been much surprised at the size of the Rabbits attacked, and at the great strength shown by the Rats in holding their victims. About two years ago when in one of my fields sowing turnips, my attention was attracted by the loud screaming of a Rabbit in a ditch close by, and on running up and looking into it I saw an old mangy-looking Rat having fast hold of a half-grown Rabbit across the loins, and struggle as he did most violently, he

could not gain an inch on the Rat, which held on like a bulldog, with his feet firmly placed against a bunch of grass steadily holding on, while the Rabbit was exhausting its strength by its violent efforts to escape.—ROBERT WARREN (Moyview, Ballina).

Climbing Powers of the Hedgehog.—I am advised by some of my friends to send you a notice of the mode in which Hedgehogs may frequently escape from confinement, and of their habits. I obtained a Hedgehog, and put it in my kitchen. Every day it is placed in a small back area, about twelve feet square, during the day-time. The waste-pipes from the cisterns discharge into this area, and the animal frequently lies under these, and, as my servant says, “wallows in the trough like a pig.” If he hears any noise he at once runs to a corner and rolls himself up. On April 14th the servant found him on the top of the partition wall between my area and the next. This wall is vertical, height nine feet six inches. The top course but one projects one inch, so he must have climbed over this. He has been watched in the operation. He climbs by the projecting mortar beds, which are rather rough, looking about him frequently to see if he is watched. He climbs up the house wall beside the pipe in the corner—an ordinary iron rain-pipe; but from the shoulder of the pipe, where it passes through the wall, to the top of the partition wall, there is a distance of nine inches without any pipe, so up this portion and over the projecting brick course he must have climbed by clinging to the wall of the house or the partition wall. On April 15th he repeated the ascent, and descended into the next area, where he was found the following morning.—ROBERT H. SCOTT (6, Elm Park Gardens).—*From ‘Nature.’*

Bat brought down by a Cockchafer.—On the evening of May 6th, between eight and nine o’clock, as my daughter was walking from the College towards the Lodge, along a shaded path, there being full-grown larch trees on either side, she was startled by something falling heavily on the ground immediately in front of her, and on stooping down to find out what it was, was surprised to see a small Bat on its back and underneath its wing a Cockchafer, which had evidently been the cause of its downfall. On the Cockchafer being removed the Bat very shortly turned over and flew off. I suppose the Bat and Cockchafer must have met accidentally in the air, the former clinging to the Bat, and thus causing the wing to drop. Perhaps the circumstance may be sufficiently unusual to be chronicled.—J. H. WILMORE (Queenwood College, near Stockbridge, Hants).

BIRDS.

Golden Oriole in the Channel Islands.—In his account of the ‘Birds of Guernsey,’ 1879 (pp. 25—30), Mr. Cecil Smith has remarked upon the scarcity of this bird in the Channel Islands, which is the more singular on

account of its being an annual spring visitor to England. He says:—"I have never seen the Golden Oriole alive or found any record of its occurrence in Guernsey or the neighbouring islands, and beyond the fact that there was one example—a female—in the Museum, which may have been from Jersey, I have been able to gain no information on the subject, except of a negative sort. The Golden Oriole is mentioned in Prof. Ansted's 'List,' as having occurred in Guernsey and Sark, but no further information is given." Mr. C. Smith thinks it probable that Guernsey was mentioned on account of the specimen in the Museum, but, he adds, "with this exception I have never heard of its making its appearance in Sark even as a straggler." Mr. Kenneth Lawson has been good enough to send us an extract from the 'Gazette Officielle de Guernsey,' dated 1st May, 1886, where it is stated that during the last week of April a Golden Oriole was caught in Sark, and after being kept alive for a few days, died and was forwarded to Mr. Jago for preservation. The Channel Islands apparently do not lie directly in this bird's line of migration when coming up from the south in spring, and yet in Cornwall and the Scilly Islands it is regarded as an annual summer visitant, generally appearing about the end of April, or first week in May (see Rodd's 'Birds of Cornwall,' pp. 28, 29). Since the receipt of Mr. Lawson's communication, a note has appeared in 'The Field' of May 15th from Mr. Caplin, of Jersey, stating that he had lately preserved an adult male Golden Oriole, which had been shot near Samaré's Manor, Jersey, on the 29th April last.—J. E. HARTING.

The Nightingale near London.—Many observers testify to the presence of the Nightingale in several localities around London, and it has been heard even in the metropolis itself—namely, in the Flower Walk, by the Albert Hall in Kensington Gardens, and in the Zoological and Botanical Gardens, Regent's Park. In May and June it may be heard commonly in the woods about Hampstead, Highgate, and Muswell Hill, as well as in the copses around Enfield, Hendon, Mill Hill, Edgware, Stanmore, and Harrow Weald. At Pinner also, and Ruislip it arrives regularly in April, and we have frequently heard it at Kingsbury and Wembley. To the south of the Metropolis it may be found in Kew Gardens, and in the neighbourhood of Wimbledon Common; while the further afield we go into Kent and Surrey the greater are the chances of meeting with it.—J. E. HARTING.

Notes on the Cuckoo.—As information is still required concerning some of the habits of the Cuckoo, perhaps the following particulars may be of interest:—In the year 1874 I used often to explore the reed-beds on the side of the River Avon in Warwickshire, where Reed Warblers bred in considerable numbers. The patches of reeds were only of limited extent, and it was not difficult to find the Warblers' nests. One day I found a Cuckoo's egg in one of the nests, and the next day I found another.

These two eggs were precisely alike, both in size, outline, and colour. I took them both. When passing the place about a week afterwards I again looked into the reed-beds, and found a third Cuckoo's egg, an exact facsimile of the two previously obtained. I took this egg, and in another nest of the Reed Warbler, containing only one of its own eggs, I substituted an egg of the Sedge Warbler, taking that of the Reed Warbler away with me. The next morning I went to see if the bird had forsaken, and was astonished to find a fourth egg of the Cuckoo placed alongside the single Sedge Warbler's egg in the Reed Warbler's nest. This egg also exactly resembled the three already obtained, and it should be mentioned that all these four eggs of the Cuckoo were deposited within a space of about 200 yards. Without rushing to any conclusions, I think we have here pretty strong, though purely circumstantial, evidence that the Cuckoo lays more than one egg during the season, and it would also appear, unless evidence to the contrary is forthcoming, that the eggs forming the Cuckoo's clutch resemble each other, as is generally the case in most clutches of other birds' eggs. It is well known that the Reed Warblers lay two distinct types of egg, a dark variety and a light variety; the former, by far the most common, being thickly blotched with a dull green on a white ground; the latter, which I think is rare, having very pale purple blotches on the white ground. I have only seen two nests of the Reed Warbler containing the latter type of egg, and, strange to say, two out of the four Cuckoos' eggs obtained were deposited alongside these pale varieties. From this it might appear that the Cuckoo selected these nests purposely, in order to assimilate as much as possible her egg with those already in the nest. I may mention that the four Cuckoos' eggs were all very light-coloured, not unlike those of the Pied Wagtail, but essentially differing from the first-mentioned dark variety of the Reed Warbler. With regard to the time when the young Cuckoo moults, on August 6th last year I got a young bird in the usual dull red and barred plumage; it had flown against the light at Souter Point (electric) Lighthouse at 2 a.m. that day, and had killed itself. What was it doing there at that time of day, if not migrating? The man at the lighthouse thought it was a Sparrowhawk.—ALFRED CRAWHALL CHAPMAN (Sunderland).

The Note of the Female Cuckoo.—Some observers have expressed their belief that the female Cuckoo, like the male, utters the well-known call—a minor third sung downwards. In some excellent observations on the habits of this bird, published in the 'Magazine of Natural History' (vol. viii. pp. 325–340), the late Mr. Blyth remarked.—“The common and more generally known note, *Cuckoo*, is alike repeated either when perched or on the wing, and, I am fully confident in my own mind, *by both sexes*; but I will not speak quite positively on this point till I have myself examined a female which had been heard to sing. It is the decided

opinion, however, of several observant persons of my acquaintance, for the accuracy of whose observations I have the highest regard, that *this note is common to both sexes*; and one even tells me that, as with gun in hand he was once talking to a friend, a Cuckoo alighted upon a tree close by, and several times repeated its call: he was desired to shoot it, and did so; and a day or two afterwards his friend told him it was a pity he had shot it, for it had an egg almost ready to lay." Blyth adds, "I give this upon unquestionable authority." This seems positive evidence enough, and yet Prof. Newton, in the second volume of the 4th edition of Yarrell's 'British Birds,' referring to this very statement by Blyth, says (p. 390, note) that "it does not rest on his own observation, and he with others may be safely deemed to have been misled in the matter" (!). Prof. Newton himself says (on the same page) that female Cuckoos "have no loud and musical note to attract attention—one that they utter has been compared to the cry of the Dabchick, another (or perhaps the same) sounds to the writer not unlike the call-note of the Whimbrel." [The call of the Dabchick and that of the Whimbrel are totally unlike; the first being a short sharp monosyllabic cry, and the other a rapid iteration of one note, which may be described as a melodious whistle.—ED.] My own observation leads me to believe that both sexes of the Cuckoo utter a variety of notes. On May 5th I saw a Cuckoo calling in a tree; in a few seconds it was joined by another, evidently a female from the attentions paid it by the first comer. The first one uttered a kind of cooing note, while the second uttered a note something like the bark of a dog. As they were approached they flew off, the female uttering a note something like that of the Fieldfare, and both called while flying. Before they settled again they were pounced upon by a Rook, which stooped at them like a hawk.—FRANCIS HEAD (Lancing College, Shoreham).

Young Cuckoo ejecting the Young of its Foster-parent from the Nest.—I can confirm the fact of the young Cuckoo ejecting the young of the species in whose nest it is fostered, alluded to by Mr. John Hancock (p. 203), a case having once come under my own observation, the particulars of which are as follow;—Having found a young Cuckoo in the nest of a Hedge Accentor, from which the rightful owners had not long been ejected (for they were alive and warm), I determined to replace them, or at least one or two, but the usurper left very little room, appearing to very nearly fill the nest. However, I tried the experiment of returning one young Accentor to the side of the young Cuckoo; whereupon the latter began to make a fluttering or wriggling movement until it got under it, and finally forced it over the side of the nest. I repeated the experiment several times, not only with a young bird, but also placed pieces of dried earth, sticks, or any extraneous substance at hand, always with the same result. Upon attempting to remove the young intruder, it hung on to the lining at the

bottom of the nest with its claws, like a hawk, with such pertinacity that I allowed it to remain.—R. P. HARPER (Scarborough).

Cuckoo feeding its Young.—The following observations are condensed from a MS. note by the late Mr. Harley, of Leicester:—It is remarkable that, although the Cuckoo takes no part in nidification nor incubation, its eggs being entrusted to the care of other birds, yet, when its offspring is on the wing, I have noticed its anxiety to provide for it. Ornithologists appear to have overlooked this fact. In September, 1854, I was on a visit to a friend, when my attention was directed towards a Cuckoo which lingered about the outlet and orchard surrounding the house. Walking beside a tall hedge which bounded the outlet and fenced in a number of hayricks, I was one day startled by the Cuckoo, as it glided by me, and alighted on a cross-rail hard by. Remaining perfectly still, I saw a young one, just fledged, approach the spot where the old bird was, and shortly afterwards I saw the latter engaged feeding it. In the course of the day, in company with a friend, I observed the parent Cuckoo performing a similar task, after which she fled away at our approach, and was lost in an adjoining thicket.—(Communicated by Mr. M. Browne, Leicester).

Ornithological Notes from Germany.—The weather in this part of Germany, after a very severe winter, began to break up on March 20th; and about this date, and even before, many summer migrants began to arrive. Sky Larks (*Feldlerchen*) appeared on March 5th, and White and Pied Wagtails (*Bachstelzen*) on the 19th, but the pied species only remained a few days; and now (March 31st) the White Wagtails have already begun to build; every night a flock of forty or fifty of these birds roost in some bushes overhanging the water, and they sit very close together, probably for warmth. On March 16th a large flock of Carrion Crows (*Raben*), Jackdaws (*Dohlen*), and Rooks (which have been very scarce all the winter) were observed migrating north-eastwards, at a considerable elevation. On the 22nd March a flock of Peewits (*Kiebitze*) settled in some meadows here to rest, but afterwards continued their flight in a northerly direction,—the wind was south,—and the next day I saw another flock flying north-east, the wind being east. The most interesting fact, however, in connection with the spring migration has been the extraordinary migration of Cranes (*Kraniche*), of which great numbers have passed over; the first flight that I observed, consisting of from eighty to one hundred birds, flew over on March 23rd, and rested for a short time in a stubble-field near until they were disturbed by a gun being discharged at them, when they flew off in a long line towards the north-east. Shortly after this flock had gone no less than nine more flocks flew over, towards the north, each consisting of from forty to one hundred or more birds, the wind being east and the weather very fine. The Robin (*Rothkehlchen*) and Song Thrush (*Drossel*), as well as the

Greenfinch (*Grünfink*) are only summer visitors to this part of Germany; the two former arrived on March 24th, and the latter on March 28th. On the 24th, also, a Water Ouzel (*Wasseramsel*) was seen close to the mill. On the 25th March Chiffchaffs had arrived, and were heard singing lustily. On this same date I saw more large flocks of Cranes, some flying towards the north, and others towards the north-east. In every case they made their presence known by their musical cry. Most of these flocks were flying at a considerable elevation, and in the form of regular triangles; the wind was south, and the weather very fine and clear. On March 28th several more parties flew over in a northerly and north-easterly direction; but a small party of three that I saw later in the day were flying south-east! The wind was then south. On this day I saw the first Goldcrest, and a Redstart on March 29th. I think the Kite (*Gabelweihe*), as well as the Sparrowhawk, are here only summer visitors, for I have seen neither during the winter, but a pair of each on March 28th. Common Buzzards (*Bussard*) have, however, been very plentiful all the winter; they have now retired to the woods for the purpose of nidification, and some may often be seen, when the weather is fine, soaring above the trees of the forest.—PHILIP W. MUNNS (Papier Fabrik, near Cassel, Germany).

Habits of the Coot.—Of the many birds once so common in our fens, the Coot is one that is fast disappearing. Sixty years ago the fowler seldom cared to kill them when other and more valuable fowl were plentiful. The Coot of to-day, however, has a rough time of it. Fearless to show himself, and easily flushed from the narrow fringe of flags or willows that border our rivers and dykes, he affords an easy shot to the poorest of marksmen. Of late years several pairs of Coots have bred in some reed-beds near Ely, arriving early in February, if the water be clear of ice. These representatives of the ancient denizens of the fens immediately establish the most stringent kind of home-rule, and, claiming their own again, as it were, my tame ducks soon become aware that they are intruders, the moorhens are made very unhappy,—in fact, all birds give them as wide a berth as possible. They are amusing enough, though I wish they would be off; still I have not the heart to evict them. Last year they killed forty-five young ducklings, which had been led into the Coot territory by their parents. The ducklings dived to get out of the way, but at this they were no match for their pursuers. Others taking to the land were in worse plight, for they were at once caught and killed by blows on the back. The agonising cries of a duck whose brood was attacked brought the drake to her assistance; the Coot desisted from his murderous intentions, but, with feathers all on end and outstretched neck (making himself look as big and terrible as might be), went to meet him. Nothing daunted, on came the drake; then ensued a duel strange and fierce. The Coot, equally handy with claws and beak, fought desperately; his antagonist was sore pressed, but at last seized the

Coot by the neck and held him so long under water that nothing, I think, but a Coot could have survived it. When at length he was liberated, he hastily dived, and was seen no more. It is a fact that, after this, no Coot would interfere with this drake. Whether the others saw the result, or had the fight related to them in bird-language, I am unable to say. This champion drake, however, is now no more, and several pairs of Coots may be seen all day long, diving and bringing up weeds from the bottom, in search of food. My ducks dare not pass them : woe to their young broods, should they have any. I should be glad to know if other observers have remarked this savage propensity of the Coot. All creatures will endeavour to protect their young, but Coots are most aggressive ; even among themselves they do not agree. Each pair has a well-defined region of reeds and water, the invasion of which at once leads to a disturbance.—JOHN TITTERTON (Ely).

Redshank breeding in Kent.—During a ramble in Kent on April 23rd, I came upon a breeding-place of the Redshank. There were at least four or five pairs of birds there, which from their actions were evidently nesting, but, after a very careful search, I could not discover any nests. I again visited the place on May 3rd, when I was fortunate enough to find all the nests, containing in every case a full clutch of eggs (four). The nests were built in a marshy place, and were a considerable distance from each other ; they were made of a little dry grass, and in every case situated in the centre of a tuft of grass. I have visited the place since, and noticed that the birds always caught sight of me before I was within two hundred yards of them ; they flew up and past me, keeping up a loud whistle all the time, and then flew off to a distant part, where I could hear them whistling, until I departed. The name of the place I have not given for obvious reasons.—R. FORTUNE (Harrogate).

Snipe and Redshank laying in the same Nest.—On the 15th April I found near my house a nest containing four eggs of the Common Snipe and four of the Redshank. As I never heard of a similar case, I should feel obliged if you would notice it in 'The Zoologist.'—JAMES SARGENT (Nith Cottage, New Cumnock, Ayrshire).

[Two species of similar habits and living in the same haunts occasionally lay in the same nest. We have known a Pheasant and Partridge to behave thus, and a Grey Partridge and a Redleg to do the same.—ED.]

Effects of Sudden Cold upon Summer Birds.—One hears on all sides of the great destruction wrought among our lately-arrived migrants by the severe weather of the second week in May. The following particulars may be of interest, and may tend to show the terrible mortality that has occurred in this district. As many as 150 Swallows and Martins were picked up at a country house near Preston ; nearly 100, almost all Swallows, were found

at St. Michael's-on-Wyre; and 64 at a mill near here. Mr. A. Edmonds, naturalist, Preston, informs me that 392 Swallows, 65 House Martins, 8 Swifts, 2 Sand Martins, and 10 Landrails, nearly 500 birds in all, were brought to him for preservation between Tuesday, May 11th, and the following Tuesday. All these had been picked up dead. Some idea may be formed of the thousands that must have succumbed to the cold and absence of insect-food during those days, in this district alone, when one considers the comparatively small proportion of these poor victims to our treacherous climate that would be found, and the still smaller proportion of those found which would be taken to one individual birdstuffer to be preserved. A keen observer of birds in this neighbourhood told me that he really thought nine Swallows out of every ten had perished.—W. FITZHERBERT-BROCKHOLES (Claughton-on-Brock, Garstang, Lancashire).

Screaming of the Cock Pheasant.—Mr. Cambridge Phillips, in last month's 'Zoologist' (p. 213), refers to the screaming of a cock Pheasant when caught by a dog. I have noticed the same thing several times when the bird, being winged, has got under thorns, fern, or other cover, and been pulled out by a dog or by hand. The sound is very like the noise made by the domestic fowl when caught, but much more shrill. I have heard the hen Pheasant make something of the same sound, but not so loud.—J. WHITAKER (Rainworth Lodge, Notts.).

Unrecorded Occurrence of the Blue-throat in East Lothian.—Through the kindness of Mr. James M'Leod, of Belhaven, Dunbar, I am able to record the occurrence of an example of this bird, which that gentleman shot in his garden at Belhaven at the end of May or beginning of June, 1868. He had it preserved, and it has been in his possession ever since that time. The upper plumage is greyish brown; the chin and upper part of breast is azure-blue, centre spot yellowish brown, with pure white below, under the azure-blue is a narrow band of black, which is followed by a broader band of rust-brown; plumage of the under parts dirty white. Mr. M'Leod informed me that the Common Redstart, *Ruticilla phœnicurus*, was more numerous than usual in this vicinity when he shot this specimen. The Blue-throat is not mentioned in Gray's 'Birds of the West of Scotland,' nor in Turnbull's 'Birds of East Lothian,' but in the 4th edition of Yarrell's 'British Birds' (vol. i. p. 352) it is stated that "Mr. Gray informed the editor that a cock was caught on board of a fishing-boat off Aberdeen, May 16th, 1872."—GEORGE POW (90, High Street, Dunbar, N.B.).

Swallows dying of Cold in May.—During the past week we have had a sharp reminder that "Winter, lingering, chills the lap of May," for on May 12th and 13th a strong N.E. gale was blowing, accompanied on the first-named day with a drenching rain. In the western part of the county

there was a heavy downfall of snow, the hills in Weardale being covered to a depth of several inches. As a consequence of this severe weather the summer migrants, and especially the Swallow tribe, have suffered greatly. At Flatts Farm, near Bishop Auckland, twelve Swallows and two Sand Martins were picked up dead on May 14th; several others were found in a half-starved state, and were taken into the house, but died in the course of the day. All these birds were in plump condition, so that it is evident they had succumbed to the severe cold. In the streets of Durham many Swallows were found dead on May 14th, and in other parts of the north-country, and particularly in the Lake District, hundreds of Swallows have been found lying dead in the fields and on the roads.—T. H. NELSON (Bishop Auckland).

Black Game in Herefordshire.—It may perhaps be worth mentioning that Black Game have lately settled down in Crasswall (on the Brecknockshire side of this county), where for the last year or two they have been met with in small numbers. They probably came from Radnor Forest, which would be about fifteen miles off.—H. H. WOOD (White House, Vowchurch, Hereford).

[Is it not more likely that they came over the Brecknockshire border? In this county, according to Mr. Cambridge Phillips ('Zoologist,' 1882, p. 138), Black Grouse are to be found on the Marquis of Camden's property near Trecastle; Mr. D. Llewellyn also has a few; and on Lord Tredegar's, Sir Joseph Bailey's, and Mr. William Vaughan's hills there is a fair stock of breeding birds.—ED.]

REPTILES.

Palmated Newt in Epping Forest.—I have the pleasure of recording a new locality for this Newt in the immediate vicinity of the Metropolis—a small pit near Chingford Station. It is quite abundant there, and occurs in company with *Molge cristata* and *M. vulgaris*.—G. A. BOULENGER (British Museum, Nat. Hist.).

Palmated Newt in Lancashire.—As I am working this summer on the life-history of our British Newts, I have asked several friends in various districts to procure specimens for me. Mr. A. Jackson, of Garstang, near Preston, brought to me, on April 19th, some Common Newts (as he supposed), captured on the 17th; but on examining them I found that they were the Palmated Newt (*Molge palmata*), which, so far as I know, has not been found before in Lancashire. I have put them in a tank, and they have already laid several eggs, whose development I am carefully observing. The tail filaments and the palmated feet of the males are not yet fully developed, owing perhaps to the lateness of the season. — LINNÆUS GREENING (Beechwood, Warrington).

FISHES.

Acclimatisation of American Lake Trout in England.—About nine years ago Mr. Basset, of Tehidy, near Camborne, stocked one of his ponds there with American Lake Trout, *Salmo fontinalis*. I heard nothing of them until about a week ago, when I was informed that a Trout had been taken in the pond referred to weighing nine pounds four ounces, and had been sent to Mr. Vingoe, of Penzance, to be preserved. I have since seen it at Mr. Vingoe's, and identified it as the Lake Trout. It measures two feet one inch over all, and seven inches at its greatest depth. Mr. Vingoe reports the flesh as pink in colour, and excellent eating.—THOMAS CORNISH (Penzance).

CRUSTACEA.

The Long-legged Spider Crab at Penzance.—On May 15th, in comparatively shallow water (about four fathoms), I took a small specimen of the Long-legged Spider Crab (*Stenorhynchus phalangium*). Bell refers to it as common, but as regards Cornwall this is only the second that I have ever seen. The first I captured on this coast on August 7th, 1877.—THOMAS CORNISH (Penzance).

ARCHÆOLOGY.

Wild Animals paid for by Churchwardens in Bucks.—In a thin 8vo volume of 76 pages, just published by the Rev. Pownoll W. Phipps, M.A., Rector and Vicar of the parish, entitled, 'Records of the Churches, Rectory, and Vicarage of Upton-cum-Chalvey, Bucks (C. Luff, Slough, 1886), some extracts are given from the Churchwardens' Accounts. From these we take the following items, as likely to interest our readers:—

				£	s.	d.
1749.	Paid for keeching of Sparrows	...	...	0	3	0
1752.	Doz. Sparrows	...	...	0	7	9
	Paid for three Hegg hoggs	...	...	0	1	0
	To John Harper for destroying	18 doz. of				
	Sparrows at 3d. per doz.	...	...	0	4	6
	To Francis Winter for 7 doz.	..	...	0	1	9
	To Charles Grimsden for 3 Hedgehogs	...	...	0	1	0
	For Hedge hog	...	...	0	0	4
1755.	10 dozen of Sparrows...	...	...	0	2	6
	6 Hedge hogs	...	...	0	2	0
	2 Hedg hogs	...	...	0	0	8
	For Polt cats	...	...	0	1	0
	For catching 2 doz. and 6 Sparrows	...	...	0	0	7½
	For destroying 1 doz. and a half of Sparrows			0	0	4½
1757, Nov. 25.	Pd Mr. Jagers for killing a pole cat			0	0	4
1777	„ Paid Tredaway for Sparrows' heads			0	0	9½
1812, May 22.	For Sparrows to this day	...	...	0	10	0
1825	„ 67 dozen Sparrows	...	...	0	16	9

These are fair specimens of the nature of the entries, the sums paid for the destruction of Sparrows, Hedgehogs, and Polecats being interspersed throughout the other entries continuously. Thus in 1759-60, 1680 Sparrows were destroyed at a cost of 3d. a dozen; 2 Hedgehogs at 4d. each; and 2 Polecats at 4d. each. Archdeacon Heslop prosecuted some farmers for destroying the ivy on old Upton Church, which harboured Sparrows. Mr. Phipps adds that the corner of Upton Lane where it joins the London Road was called "Polecat Corner," indicating probably a noted haunt of this animal in a parish where, as shown by the price paid for its destruction, it must at one time have been very common. The above entries may be compared with those extracted from the accounts of the Churchwardens for the parish of Bolton Percy, Yorkshire ('Zoologist,' 1881, pp. 257, 258), and Crosthwaite, Cumberland ('Zoologist,' 1882, p. 108). The Churchwardens of Great Wigton, Leicestershire, paid only a penny a dozen for their Sparrows. In their accounts for the year 1620 we find the item, "Paid for 16 dozen Sparrows 0.1.4." In the Accounts of the Churchwardens of Wigtoft, Lincolnshire, between the years 1512 and 1519, occurs the item, "Payd to Robt. Baddenelle for stopping caudows out, 0.0.4." *i. e.*, for stopping Jackdaws out of the church. See 'Illustrations of the Manners and Expenses of antient times in England in the 15th, 16th and 17th centuries, deduced from the accounts of Churchwards and other authentic documents, collected from various parts of the Kingdom, with Explanatory Notes. London: Printed by and for John Nicholls, printer to the Society of Antiquaries.' 1797. 4to (pp. 148, 149).

SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

April 1.—Sir JOHN LUBBOCK, Bart., M.P., F.R.S., President, in the chair.

Dr. Francis Day exhibited and made remarks on several photographs of the fully-grown skulls of *Salmo salar* and *S. fario*, in proof of the marked cranial differences which exist in the adult stages of the Salmon and Trout.

Several interesting botanical papers were read. In one of these, "Botanical Observations made on a Journey to the Naga Hill (borders of Assam)," by Mr. C. B. Clarke, the author stated that the Nagas eat dog extensively, and that dogs are largely imported for the table from Munipoor. In this respect the Naga natives resemble the Chinese.

April 15.—W. T. THISELTON DYER, C.M.G., F.R.S., Vice-President, in the chair.

Mr. Rochfort Connor, of Greenock, was elected a Fellow of the Society.

The following gentlemen were chosen as Auditors to examine the Treasurer's accounts:—Mr. J. Jenner Weir and Mr. Fred. W. Dickins as representing the Fellows, and Mr. Thos. Christy and Mr. T. B. Forbes as representing the Council.

Specimens of so-called Madrepore Marble from Iowa, U.S., were shown for Mr. G. A. Treadwell, the abundance of *Stromatopora* giving the specimens in question a peculiar character.

A paper was read "On new African Genera and Species of *Curculionidæ*," by Mr. Francis P. Pascoe. The author remarked that the localities from which the greater part of the species described by him were derived are, so to say, new to scientists. They are Momboia, a missionary station north of Lake Nyassa; Landana, a new settlement on the Congo; and Mayotte, one of the Comoro Islands of Madagascar. Mr. Pascoe admits that entomological literature is now so extensive that possibly some of his own supposed new species may already be known; but the difficulty on his part may be more openly due to the inadequate descriptions, without any reference to affinities or diagnostic characters, given by some entomologists. He is inclined to think that a precise diagnosis and considerations of affinity are often of more importance than the mere descriptions themselves. He states that there is probably no family of insects in which greater diversity of appearance in the same genus is to be found than in the *Curculionidæ*. Species the most dissimilar are not to be separated by any characters which are usually deemed to be of generic value, and in extreme cases we have to fall back on secondary characters, which after all may be quite as natural. On the other hand, species which are very much alike in appearance are found to belong to widely different groups: while, again, the absence in many cases of any correlation between the characters makes the classification difficult, and necessitates an undesirable but unavoidable number of genera, if anything like definiteness is to be maintained, under the present conditions of insect nomenclature. Mr. Pascoe acknowledges his indebtedness to Mr. Simpson, of the Geographical Society, and to M. René Oberthur, of Rennes, for their liberality in the presentation of specimens from their collections. The author describes in his paper some thirty-two new species, eleven new genera under nine subfamilies, with illustrations.

An important contribution to the Natural History of the Roraima district, British Guiana, was read by Everard F. im Thurm, the account of the vegetation, however, forming the major share of the material dealt with.

May 6.—Sir JOHN LUBBOCK, Bart., F.R.S., President, in the chair.

Prof. Henry Marshall Ward was elected a Fellow of the Society.

The President alluded to the loss the Society had sustained in the

somewhat sudden demise of Prof. Thomas Spencer Cobbold, a Fellow of long standing, and who had contributed many important papers to the Society's Journals and Transactions, his latest paper being now in press. Dr. Cobbold had bequeathed to the Society's library sixty handsomely bound volumes, chiefly rare and valuable monographs on his special subject of parasites. A special vote of thanks was unanimously accorded by the Fellows to Mrs. Cobbold and family for the donation in question.

Mr. Daniel Morris exhibited a number of living beetles (*Pyrophorus noctilucus*) from the island of Dominica. These had been fed on sugar-cane during the voyage to England. On the meeting-room being darkened the phosphorescent show of light emitted was very brilliant.

Mr. George J. Romanes then read a communication on "Physiological Selection; an additional suggestion on the origin of species." He stated that, considered as a theory of the origin of species, Natural Selection encounters three cardinal difficulties: 1st, it cannot explain sterility between species, or the primary specific distribution; 2nd, it cannot explain many among the secondary specific distinctions, or those trivial details of structure which, while serving to distinguish one species from another, present no meaning of a utilitarian kind; 3rd, Natural Selection must always be so heavily handicapped by the swamping effects of intercrossing upon any new variation, that unless such intercrossing is in some way prevented, we may reasonably doubt whether Natural Selection alone could change one *species* into another in more than a very small percentage of cases, although, when intercrossing is prevented by the bar of sterility between species, Natural Selection may afterwards produce genera, families, orders, and classes. In view of these considerations Mr. Romanes contended that the theory of Natural Selection has been misnamed a theory of the origin of species. It is, in truth, a theory of the origin of adaptive structures; and, if unassisted by any other principle, could not effect the evolution of species. The only other principle that could here assist Natural Selection would be one that might mitigate the swamping effects of intercrossing. This may be done by geographical barriers shutting off a portion of a species from the rest, and on allowing that portion to develop an independent course of varietal history without intercrossing with the parent form. It may also be done by portions of species migrating, changing habitual stations, &c. But it may also be done by what he would call Physiological Selection, or by virtue of a variation taking place in the reproductive system in the direction of sterility (whether absolute or partial) with the parent form, without impairment of fertility within the varietal form. For instance, the season of flowering or of pairing may be either advanced or retarded in a portion of a species when all the individuals in that portion (or new variety) would be absolutely sterile towards the rest of the species, while completely fertile among

themselves. They would thus start on an independent course of varied history. Sundry other causes (both extrinsic and intrinsic) may determine this particular variation in the reproductive system; and wherever it occurs it must give rise to a new species to record the fact. The proof of its occurrence is furnished both amongst our domesticated varieties and in nature. It explains the sterility between species, the frequent inutility of other specific characteristics, and entirely escapes the difficulty from inter-crossing. It therefore relieves the theory of Natural Selection from the disabilities under which it lies in consequence of having been improperly advanced as a theory of "the origin of species." A discussion followed, in which Prof. Duncan, Mr. Breese, Mr. Dyer, Mr. Seebohm, the Rev. R. P. Murray, Mr. Michael, the President, and others, took part.

The following technical paper was subsequently read in abstract, *viz.*, "Descriptions of new species of *Galerucidæ*," by Mr. Joseph S. Baly.—J. MURIE.

ZOOLOGICAL SOCIETY OF LONDON.

April 20.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

Mr. O. Salvin exhibited a living specimen of a foreign worm, *Bipalium kewense*, found in a garden in Sussex.

The Secretary read an extract from a letter addressed by Mr. R. A. Sterndale to Sir Victor Brooke, concerning a case of hybridism between *Ovis hodgsoni* and *O. vignei*.

Mr. J. Bland Sutton read a paper in which he gave an account of some of the investigations he had made during the past twelve months into the diseases affecting the Mammals living in the Society's Collection.

A communication was read from Dr. O. Finsch, describing a new species of Wild Pig from New Guinea, which he proposed to call *Sus niger*.

Mr. Smith Woodward read a paper on the relations of the mandibular and hyoid arches in a Cretaceous Shark, *Hybodus dubrisiensis*, Mackie.

A communication was read from Professor R. Collett, of Christiana, containing an account of the hybrid between the Willow Grouse, *Lagopus albus*, and the Black Grouse, *Tetrao tetrix*, which occurs occasionally in Norway, Sweden, and Northern Russia, and of which the author had examined altogether thirteen specimens, most of them of the male sex.

Mr. G. A. Boulenger gave the description of a new Iguanoid Lizard living in the Society's Gardens, for which he proposed the name *Ctenosaura erythromelas*. The exact locality was unknown.

A second paper by Mr. Boulenger contained remarks on specimens of a scarce European Frog, *Rana arvalis*, exhibited in the Society's Menagerie.

May 4.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of April, 1886, and called attention to an example of a Lizard belonging to a new species of the genus *Otenosaura*, which Mr. Boulenger had lately described as *C. erythromelas*, obtained by purchase; and to a fine male example of the Lesser Koodoo (*Strepsiceros imberbis*) from Somali-land, received in exchange.

Mr. E. L. Layard exhibited a fine example of a rare Beetle of the family *Cerambycidae* (*Macrotoma heros*), obtained in the Fiji Islands; and a series of specimens of shells of the genus *Bulimus* from New Caledonia and the adjacent islands.

A letter was read from Mr. F. W. Styan, relating to some Chinese animals of which he had lately obtained specimens.

Mr. W. F. Kirby read some remarks on four rare species of *Sphingidae*, of which he had lately examined specimens.

Mr. F. E. Beddard read a paper containing observations on the ovarian ovum of *Lepidosiren* (*Protopterus*), and described the entrance of follicular cells into the interior of the ovum. It was believed that these cells played an important part in the formation of the yolk.

Mr. Beddard also communicated a paper by Mr. J. T. Cunningham, on the mode of attachment of the ovum of the Smelt, *Osmerus eperlanus*.

May 18.—Prof. W. H. FLOWER, LL.D., F.R.S., President, in the chair.

Mr. C. W. Rosset exhibited a series of photographs taken during his recent visit to the Maldiv Islands, and made some remarks on the zoological collections obtained during his expedition.

Mr. Philip Crowley exhibited some pupæ of nocturnal *Lepidoptera* which had been sent to him from Natal; and read some notes from his correspondent, which proved that they were subterranean.

Mr. Joseph Whitaker exhibited a specimen of Wilson's Phalarope, said to have been obtained at Sutton Ambian, near Market Bosworth, in Leicestershire.

A communication was read from Dr. A. B. Meyer, containing an account of the known specimens of King William the Third's Bird of Paradise, *Rhipidornis guillemi-tertii*, and remarking on a fourth specimen which had been recently obtained by the Dresden Museum.

Mr. Frank E. Beddard read a paper on some new or little-known Earthworms, together with an account of the variations in structure exhibited by *Perionyx excavatus*.

Mr. Sclater read a paper on the species of Wild Goats and their distribution. Mr. Sclater recognised ten species of the genus *Capra*, distributed over an area extending from Spain to Southern India, and from Central Siberia to Abyssinia.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

May 5, 1886. — Prof. J. O. WESTWOOD, M.A., F.L.S., Hon. Life-President, in the chair.

Mr. William Saunders, the President of the Entomological Society of Ontario, was present as a visitor.

The following were elected Fellows of the Society, *viz.*:—The Rev. E. N. Bloomfield, M.A., Mr. Frederick Fitch, Mr. A. J. Rose, and Mr. William E. Nicholson.

Mr. Jenner Weir exhibited a large and spiny lepidopterous larva which he had received some years ago from the late Andrew Swanzy, who obtained it in Western Africa.

Mr. Stevens exhibited a number of Coleoptera recently obtained in the Isle of Wight, including *Apion Sorbi*.

Mr. Crowley exhibited four specimens of *Leto Venus*, a large moth belonging to the family *Hepialidæ*, from Natal.

Mr. Howard Vaughan exhibited a long series of *Cidaria immanata* from Kent, Surrey, and other southern counties, Perthshire, Isle of Man, Isle of Arran, the Orkneys, and Shetlands. He also exhibited *C. russata* from various localities in the South of England, and from Perthshire, Argyllshire, and the Islands of Arran, Lewis, and Hoy. Mr. Vaughan further exhibited varieties of *C. suffumata* from Dover and Darlington.

Prof. Westwood commented on the interesting nature of the exhibition of *C. immanata*, and stated that he had never before seen such a wonderful collection of varieties of a single species.

Mr. M'Lachlan exhibited, for Mr. G. Lewis, living specimens of *Paussus Favieri* (Fairm.), lately collected in Portugal by Mr. Lewis.

The Rev. W. W. Fowler exhibited *Staphylinus latebricola* and *Quedius truncicola*, both from the New Forest.

The Secretary exhibited, for Mons. H. de la Cuisine, of Dijon, coloured drawings, life-size, of a variety of *Urania Cræsus*, and a variety of *Papilio Memnon*; and Prof. Westwood made some observations on them.

Mr. G. Elisha exhibited specimens of *Antispila Pfeifferella*, together with the cases, and the leaves mined by the larvæ.

Mr. J. W. Slater read a paper "On the Origin of Colours in Insects," in which he showed that the assertions of Mr. Grant Allen, that all brightly coloured insects were flower-haunting species, were incorrect; and that many brilliantly coloured insects were carnivorous. Mr. M'Lachlan said that the physiological question in connection with colour had not been paid attention to; he thought that colour in insects was to a great extent dependent upon the circulation of fluids in their wings. The discussion was continued by Prof. Westwood, Mr. Goss, the Rev. W. W. Fowler, Mr. Jacoby, and Mr. Weir.—HERBERT GOSS, *Secretary*.

NOTICES OF NEW BOOKS.

The Wanderings of Plants and Animals from their first home.
By VICTOR HEHN. Edited by J. S. STALLYBRASS. 8vo,
pp. 500. London: Sonnenschein & Co.

THE history of domesticated animals and cultivated plants is of considerable interest, forming no small part of the history of man himself and his slow advance to civilisation. The subject is susceptible of different methods of investigation which do not always give the same results, the conclusions arrived at varying as they are derived from Natural Science, Ancient History, Literature, or Language.

Prof. Hehn is of opinion that of late years the scientist has had too much his own way, and that it is time for students of History and Philology to be heard. Hence his own work with the above title, which the editor, Mr. Stallybrass, now presents in an English dress.

The first thing that strikes us on looking through the volume is the unskilful arrangement of the subject-matter. The chapters on animals should have been kept distinct from those on plants, instead of being intermingled in the way they are at haphazard. It is distracting and irritating to pass from "the horse" to "the vine," from "asses, mules, and goats" to "stone architecture" (a chapter which might well have been omitted), from "cucurbitaceous plants" to "the domestic fowl," or from "the carob-tree (*Ceratonia siliqua*)" to "the rabbit"!

Both author and editor display an unfortunate want of acquaintance with systematic Natural History, and, strange to say, with the discoveries of Darwin, a shortcoming which has led, amongst other mistakes, to an altogether exaggerated view of the changes which have been effected in the flora of Europe by man's agency.

But confining our attention to that portion of the work which deals with "the wanderings of animals," we may say that, despite the drawbacks to which we have above referred, and a certain heaviness of style not uncharacteristic of German writers, there is a good deal of curious information to be extracted from

the book by a patient reader, touching the early history of domesticated animals, and the introduction of species into countries new to them.

A few extracts will suffice to show the writer's style, and the nature of the information afforded :—

(P. 112). “The *mulus* (Greek *μυχλος*) or mule was brought to Italy, as the name proves, from Greece. The Latin name was afterwards used by all the nations which adopted the animal. In Varro's time, just as now, carts were drawn along the high-roads by mules, which were not only strong, but pleased the eye by their handsome appearance. The Greeks were equally delighted with the animal, and Nausicaa's car is drawn to the sea-shore and back by mules.”

“The goat was used as a domestic animal in the mountainous districts of the south, where cultivation more resembled that of gardens than of fields. Stony Attica, rich in figs and olives, nourished innumerable goats; and one of the four old Attic phylæ was named after the goat. Even if the animal came into Europe with the first Aryan immigrants, and accordingly the Hellenes and Italians had not to make its acquaintance after reaching their arid home, yet it was only there, and under the Semitic mode of cultivation there adopted that it found its proper place and true use.”

(P. 259). “It is probable that Italy first became acquainted with the domestic pigeon by means of the Temple at Eryx in Sicily. On that mountain, an ancient seat of Phœnician and Carthaginian culture, there lived flocks of white and coloured pigeons sacred to the great goddess there worshipped, and participating in the festivals celebrated in her honour. The Sicilian Greeks, as we infer from the Latin name *columba*, *columbus*, called the bird when they first saw it *kolymbos*, *kolymba*, diver, waterfowl, for the wild doves that inhabited the cliffs, the rocks, and the summits of high trees were dark in ‘comparison’ with the waterfowl which were distinguished by the adjective white. The Greek *kolymbos* has an analogue in the Lithuanian *gulbe*, and Old Irish *gall*, swan, meaning the white waterfowl. This semi-domestication of the wild pigeon probably existed in very early times, not only in Asia Minor, but in the East in general. From Italy the domestic pigeon overspread Europe. The Celtic names (Old Irish *colum*, Welsh and Old Cornish *colom*, Breton *koulm*, *kloim*), as well as the Slavic names (*golabi*, &c.), were all borrowed from the Latin.”

Besides the domestic fowl and the Pigeon, three other birds were brought from Asia to Greece in historic times, “to satisfy

the desire for wider and richer experience excited by higher stages of civilisation." These were the Peacock, Guinea-fowl, and Pheasant (p. 264):—

"The Greek name for the Peacock *taos* (which in Attica was quite exceptionally pronounced *tahos*), proves it to have been introduced to the Greeks from Semitic Asia. Probably the first place at which peafowl were kept on Greek soil was the Heræum of Samos, for the legend of that temple makes it the spot where peacocks first originated, and whence they were introduced into other countries."

The Greeks called the Peacock *tawos*, *tawon*, *tahos*; the Romans called it *Pavus* or *Paro*, *paronis*. This substitution of a *p* for a *t* is explained by a supposed difference in Semitic dialects (p. 269). In all the European languages the name of the Peacock begins with the Latin *p*, and not with the Greek *t*, a clear proof that the bird was introduced into barbaric Europe, not from Greece or the East, but from the Appenine peninsula.

The chapter on the Pheasant (pp. 274—276) is short and not very satisfactory; although the remarks on the derivation of the word *tetrao* (from the Median and Persian), and its misapplication to other species supposed to resemble Pheasants, are worth perusing.

Besides those mentioned, other birds dealt with are the Guinea-fowl, Goose, and Duck, with a chapter also on Hawking. The Mammalia treated of are the Horse, Ass, Mule, Goat, Rabbit, Ferret, Cat, and Buffalo.

The Birds of Cumberland critically studied: including some Notes on the Birds of Westmorland. By the Rev. H. A. MACPHERSON, M.A., and WILLIAM DUCKWORTH. 8vo, pp. 206. Carlisle: Thurnam & Sons. 1886.

CONSIDERING the state of existing literature on the Natural History of the two counties above mentioned, a brief sketch of which will be found in the Introduction to the present volume, Messrs. Macpherson and Duckworth's account of the Cumbrian avifauna has been undertaken none too soon. It would have been difficult, perhaps, to effect a more satisfactory literary partnership than that which has been arranged; for while Mr. Macpherson's energy as a collector and acquaintance with

the published observations of his predecessors have enabled him to bring together a considerable amount of useful material, Mr. Duckworth contributes the results of twenty years' investigation of the Ornithology of his county. In addition to this Mr. Duckworth has paid special attention to such inland breeding species as the Dipper and Pied Flycatcher; while Mr. Macpherson has made himself more particularly acquainted with such birds as frequent the marshes and the coast-line; although neither author apparently has confined his observations to any one group, or to any one part of the county. As a result they have prepared a list of 250 species, of which 84 are stated to be resident, 81 periodical migrants, and 85 rare visitants.

As might be expected from the physical features of the Lake District, there are several species of birds which, if not peculiar to the two counties mentioned, are at all events characteristic of them, and which at the present day are perhaps commoner there than in any other part of England. Amongst these may be mentioned the Common Buzzard, Peregrine, Merlin, and Raven, all of which still breed in the Lake District, although in diminished numbers. Along the mountain streams the Dipper and Grey Wagtail are commonly to be met with, the former, it is said, having increased of late years. The Pied Flycatcher is another bird which is said to be more numerous than it used to be a few years ago, and the Twite and Lesser Redpoll are characteristic moorland species.

Taking Dr. Heysham's Catalogue of the Birds of Cumberland in Hutchinson's History of the County (1797) as a standard for comparison, Messrs. Macpherson and Duckworth have made some interesting additions to it from recent observation and correspondence. For example, they tell us that the Chough, which is not included in Dr. Heysham's list, was certainly resident in Cumberland during the first half of the present century, and, until about the year 1860, used to breed regularly at St. Bee's Head. The Stock Dove also, about which Dr. Heysham was uncertain, is now considered to be resident in Cumberland, and to have extended its breeding range considerably.

It is of interest to note that a couple of centuries ago the Pheasant became exterminated in Westmorland, in consequence of the extensive cutting down of woods which then took place,

and that it was subsequently reintroduced. In the Machell MSS., preserved in six volumes in the library of the Dean and Chapter of Carlisle, being collections for a history of the counties of Westmorland and Cumberland, formed by the Rev. Thomas Machell, Rector of Kirby Thore, who died in 1698, the following note occurs (vol. i. p. 137) on the Pheasant in Westmorland :—

“They have no Phesants. The species of them being soe tame a fowle are long since destroyd, and, since the great forrests have bin depopulated of their wood and verdure, so that there is little or none on the mountanes for want of copses and covert, to fly too at severall stages, they could never yet be restored agane. But it hath bin lately attempted by Mr. Lowther to restore that game who 2 or 3 years since brought young ones over out of Yorkshire hither; but the country people destroy'd them before they increased to any considerable replennishing number.”

The editors of Hutchinson's ‘History of Cumberland,’ in a note to the account of the parish of Muncaster, remark that the game of the district consisted of Hares, Partridges, Grouse, and some Pheasants *introduced by Lord Muncaster*. Dr. Heysham, writing about the same time (1794—97), remarked, “The Pheasant is a rare bird in Cumberland, but Sir James Graham and some other gentlemen are attempting to introduce them into the county.” At the present time it is once more abundant; while the attempts to introduce the Capercaillie on the Netherby Estate have failed.

Our readers may perhaps remember that in ‘The Zoologist’ for 1881 (pp. 44 - 47), Mr. A. G. More detailed the result of his inquiries into the statements made by Pennant and Latham, and repeated by later writers, to the effect that the Ptarmigan was formerly to be found upon the lofty hills near Keswick, in Cumberland; the conclusion at which he arrived being that the so-called Ptarmigan were merely Grouse having an unusual amount of white in their plumage. According to Messrs. Macpherson and Duckworth, however, there really were Ptarmigan at one time on Skiddaw, some having been imported from Scotland and turned out there within the memory of a correspondent still living at Bassenthwaite. It would be interesting to ascertain, while the correspondent referred to is still living, the precise date of this attempted introduction, which we are told was a failure, the number of birds turned out, and whether any broods were ever reared before the stock was extirpated.

Those who are aware of the rarity of the Dotterel (*Eudromias morinellus*) in England during the nesting season will naturally turn with curiosity to the account given of that bird in the book before us (pp. 133—138), the greater part of which consists of a narrative by Mr. F. Nicholson, “embodying the results of an unequalled acquaintance” with this bird in its north-country breeding haunts. While referring to the older records relating to this species, our authors might as well have noticed “the mical Doterall,” mentioned in the Machell MSS. (vol. i. p. 137), and called the “mical” (*i. e.*, mickle or great) Dotterel, to distinguish it from the smaller Ringed Dotterel (*Ægialitis hiaticula*). This allusion to the Machell MSS. reminds us that it would have been better to mention these in the Introduction, under the head of MS. information (p. xv), instead of by way of Appendix at the end of the volume.

On the same page of the Introduction it would have been well to give *the date* (1675) of Edmund Sandford’s MS. Description of Cumberland, or rather the MS. which is attributed to Sandford (a gentleman of good family in the county), for we believe his name does not occur on the face of it. We have not had an opportunity of consulting the original MS., which is preserved in the library of the Dean and Chapter of Carlisle, but, if Jefferson’s quotation from it be accurate (Hist. and Antiq. Carlisle, 1838, p. 361), it will be necessary to make a slight correction on page 125 of the ‘Birds of Cumberland,’ namely, for “black heath cocke and more cockes” read “black heath-cockes and brone more-cockes.”

At p. xiii of the Introduction, Mr. Macpherson, referring to Robinson’s ‘Essay towards a Natural History of Westmorland and Cumberland,’ 1709, says that this author records the presence of Swans in the lakes [Bassenthwaite Lake, p. 60], “but his ocular observations appear to have been confined to subterranean matters.” This is not quite correct, for in the second part of the book, on “The Power of Natural Instinct,” are several original observations on Frogs, Ants, Bees, and Birds, some of which might have been appropriately quoted under the head of the species to which they relate. As the book in question is not a particularly common one, we may quote two of the observations relating to birds, one having reference to the Moorhen, the other to the Rook:—

"We observe that when the Moorhen finds her nest likely to be discovered, she flies from it as if she were broken-back'd, and lame both of wing and limb, tempting her enemies to pursue her in hopes to take her, 'till the sight of her nest be lost" (p. 95).

The observation relating to the Rook runs as follows :—

"About 25 years ago, coming from Rose Castle early in the morning, I observed a great number of Crows (*sic*) busy at their work, upon a declining ground of a mossy surface; I went out of my way on purpose to view their labour, and I found they were planting a grove of oaks: the manner of their planting was thus, they first made little holes in the earth with their bills, going about and about; 'till the hole was deep enough, and then they dropp'd in the acorn and covered it with moss. This young plantation is now growing up to a thick grove of oaks fit for use, and of height for the Crows to build their nests in. I told it to the owner of the ground, who observed them spring up, took care to secure their growth and rising. The season was the latter end of autumn, when all seeds were full ripe" (p. 97).

Another observation on the behaviour of young 'Turkeys when the Kite comes (p. 95) testifies to the former existence in Cumberland of a bird of prey, which is now extinct there.

In regard to classification and nomenclature, we perceive that Messrs. Macpherson and Duckworth have followed 'The Ibis' List of Birds, but in spelling specific names *with capitals* they have adopted an unsightly practice which is not sanctioned either by the British Ornithologists' Union or by the American Ornithologists' Union, whose recently published 'Code of Nomenclature and Check List of North American Birds' was noticed in our last number.*

We could point out a good many more misprints in the 'Birds of Cumberland' than are corrected in the list of errata, but we prefer to direct attention to the "Glossary of Names used in Cumberland" (pp. 195—197), and to the neat folding map which precedes the Introduction.

A coloured plate of the Dotterel by J. G. Keulemans forms an appropriate frontispiece.

* In the notice referred to, on p. 223, two unfortunate typographical errors escaped correction. In line 21 for "moth" read "motto," and in the last line but one on the same page, for "recommendation" read "reconsideration."



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BEAVERS AND THEIR WAYS.*

BY J. E. HARTING, F.L.S., F.Z.S.

It is always unwise to attempt to generalise from insufficient data, as it is to draw conclusions solely from personal experience. It is only from a study of the united testimony of competent observers that we can hope or expect to arrive at the truth ; and this holds good not only of Zoology, but, it may be said, of all human affairs. Hence we should by no means neglect to peruse what has been written by the ancients, as well as by the best modern authorities, on any subject that we may take up.

It is true that in the early literature of Zoology, as, for example, in the works of Herodotus, Aristotle, Pliny, Ælian, and even much later, in those of Gesner, and Aldrovandus, we find very much that is fabulous, mingled with a little that is true ; reminding us forcibly of Falstaff's "ha'p'worth of bread" to his "intolerable deal of sack." But the ha'p'worth of truth that is to be found amidst so much fable is well worth looking for ; and it should be borne in mind that the old writers who collected information for their works on Natural History laboured under very great difficulties, with none of the advantages which we now enjoy in the shape of railway travelling, postal communication, and printed books. They had to rely upon their own individual researches, local traditions,

* An abstract of one of the "Davis Lectures," delivered at the Zoological Gardens, June 24th, 1886.

or the oral testimony of travellers, who themselves perhaps had only second-hand information to impart, and were doubtless frequently imposed upon.

Then again, except by the process of embalming, known only to a few, they had no method of preserving animals so as to enable their transportation to a distance. They had to rely upon descriptions given from memory, or upon very crude drawings not always taken from life, and therefore often very inaccurate. Under these circumstances it is not surprising that we should discover in their works a good deal of fiction ; we should perhaps rather wonder at there being so much truth in what has come down to us ; the more so when we reflect that even at the present day there is a vast amount of popular misconception concerning some of the commonest animals, which is only very slowly being cleared away,—so difficult is it to eradicate popular delusions which have once firmly taken hold of the public mind.

In the Beaver, about which I propose to say something to-day, we have just one of those animals which, imperfectly known to the ancients, would be most likely, from its singular conformation, to give rise to all sorts of curious speculations amongst those who had never seen one, or were unacquainted with its real habits and mode of life.

In the days when Whales were regarded as fish (as, indeed, they are nowadays by many uninformed persons) it was perhaps not unnatural to suppose that this curious animal, with a tail quite unique of its kind amongst mammals, might have some relationship to a fish, a surmise which would be strengthened by its reported aquatic habits.

A curious little work, entitled ‘The History of Brutes ; or a description of Living Creatures, wherein the Nature and Properties of four-footed Beasts are at large described,’ was translated into English in 1670 from the Latin (1665) of Dr. Franzius, Professor of Divinity in the University of Witteberg, a man (as his translator tells us) famous in his time for his great learning. In this volume (p. 222) we find the following quaint account of the Beaver :—

“ This is an *amphibious* creature, hath four feet, two of a *dog* and two of a *goose* ; his fore part is hairy ; he hath a long, broad, ruggid tail, like the tail of a fish ; his feet are skinny, which maketh him swim with a great deal of ease ; he cannot dive

long together being of very short breath; and therefore is fain often to put his head up above water for air: he biteth very hard, and loveth to be among fishes, or where they are: he may be like a thief in this thing, for he loveth to lye in the way that passengers come oftenest by. He loveth to be upon the banks of rivers and in those places where trees grow close to the water; and there he will sit with his body on the tree and his tail in the water: his subtilty is seen in this, that he will make a tree hollow with his teeth as if it were made so by art. The tree that he thus holloweth he maketh three cells in it, one above another; and if it raineth so that the tree is full of water, then he goeth up a storey higher, and according as the water decreaseth or increaseth, so he goeth up higher or lower in the tree; yet so that still he may keep his body dry, and his tail in the water.

“This may teach us,” he says, “to forsee dangers that are coming upon us, and to arm ourselves against them.”

The way in which some of these old writers loved “to point a moral and adorn a tale” must strike readers at the present day as somewhat amusing.

According to Albertus Magnus, a tree being cut down and prepared by Beavers, they take one of the oldest of their company (whose teeth are useless for cutting purposes) and make him lie flat on his back, pile up the wood upon him, neatly packed between his fore and hind limbs, and then drag him by the tail to the water-side, where their huts are to be built. He forgets that by such a process all the fur would be rubbed the wrong way, a course of treatment which no animal could be expected to submit to with complaisance.

Topsel, in his ‘History of Four-footed Beasts,’ 1658, describes the size of the Beaver as “not much bigger than a countrey dog,” but he omits to mention the size of the dog! The tail, he observes, “he useth for a stern when he swimmeth after fish to catch them.”

Another fable, attributed to Agricola, asserts that the Beaver keeps the Otter in subjection, makes him sit upon his tail in time of cold and frost, and keep moving about in the water in order to prevent it from freezing.

A mistranslation, or misunderstanding of an author’s meaning, sometimes leads to amusing results. Pliny, writing of the

Beaver ('*Historia Animalium*,' lib. 8, cap. 47), says "the tail is like that of a fish; in the other parts of the body they resemble the Otter; they are both of them aquatic animals, and both have hair softer than down."

Quoting this passage, Franzius says:—" *Nam teste etiam Plinio fiber est lutra cui accessit cauda piscis, sed lutra est fiber sine cauda*" [*piscis*, understood]. But his translator, improving upon this (p. 223), puts it thus:—"Pliny saith that the Otter and Beaver are both the same, but in this they differ; the Beaver hath a tail, but the Otter hath no tail at all"! It need scarcely be said that this is altogether a libel on the Otter, which (as we all know) has a very fine tail, long, thick, and tapering.

What, then, is the zoological position and what the relationships of the amphibious Beaver, about which such marvellous stories have been told?

The form of the skull and the character of the teeth (two large incisors in each jaw separated by a wide interval from the molars, and no canines) show that it belongs to the order Rodentia, or gnawing animals, which feed entirely on vegetable substances. Although aquatic in its habits, it has nothing to do (as the ancients supposed) with the fish-eating Otter, which has a very different dentition, and belongs to the order Carnivora, or flesh-eating mammals.

The order Rodentia forms one of the most clearly defined groups of the Mammalia; a group which has representatives in all parts of the world, and the species of which are very numerous, especially in America, including, amongst others, such familiar animals as Hares and Rabbits, Squirrels, Rats, and Mice.

The most striking characters of the Rodents are those furnished by the teeth, so admirably adapted for their mode of life, and it will be observed, on examining the skull of a Beaver, that the incisor teeth have enamel *only in front*; so that, their posterior surfaces wearing away faster than the anterior, they are always naturally sloped or chisel-shaped. Their prismatic form causes them to grow from the root as fast as they wear away from the tip (their formative pulp being persistent), and this tendency to increase in length is so powerful that, if either of them be lost or broken, the corresponding tooth in the other jaw, having nothing to oppose or impede it, becomes developed to a

monstrous extent. Sometimes the width of the incisors is very great, exceeding the depth. This is noticeable in Rodents which burrow, and live almost entirely under ground, their powerful teeth being doubtless used to gnaw through the roots which would otherwise obstruct their subterranean progress. Those of the upper jaw are always shorter than those of the lower, and usually describe a little more than half a circle. The larger incisors of the lower jaw form a smaller segment of a larger circle.

The lower jaw is capable of horizontal movement, from side to side, as well as forward and back, the lower incisors moving to right and left of the upper ones, thus enabling the Beaver to masticate its food by a transverse and diagonal, as well as forward and backward, movement of the molars on each other.

The molars (four on each side in both jaws) have flattened crowns, the enamelled ridges of which are always set transversely, so as to be in opposition to the longitudinal movement of the jaw, the better to assist trituration. These flattened crowns sufficiently indicate that the food which they are intended to masticate is entirely vegetable.

The general form of the animal is stout and heavy, especially in the hinder parts; the tail is of moderate length, broad, flattened and covered with a scaly skin; the feet are all five-toed, the fore pair considerably smaller than the hinder ones, but all well furnished with claws, and the hinder pair fully webbed to the extremities of the toes.

The eyes are small, have the pupil vertical, and are furnished with a nictitating membrane. The ears are small and short, and their antitragus can be so applied to the head as almost entirely to close the auditory aperture; the nostrils are also so contrived as to be capable of being closed under water. The animal is thus admirably adapted in structure for the peculiar mode of life which it pursues.

With the exception of the *Capybara* of South America (*Hydrochærus capybara*), which is about one-third bigger, the Beaver is now the largest of living Rodents. It averages in length, from tip of nose to end of tail, about 42 in. (the tail alone measuring $9\frac{3}{4}$ to 10 in.), and 2 ft. 6 in. in girth, the weight varying from 30 to 50 and even 60 pounds. A *Capybara* shot by Darwin, at Monte Video, measured 3 ft. 2 in.

from the end of the snout to the stump-like tail, and 3 ft. 8 in. in girth, and weighed 98 pounds.*

Two remarkable animals of the Beaver tribe, but considerably larger than those now existing, formerly inhabited Europe and North America respectively, *Trogontherium* and *Castoroides*. They are both now extinct, but seem to have been contemporary with our Beavers. Their remains have been discovered in peat-bogs and lacustrine deposits posterior to the drift. The American genus *Castoroides* was much the larger of the two. It was more than twice the size of our Beaver: the length of its skull, for instance, was nine inches instead of four, while the European *Trogontherium* was a fifth larger than our Beaver.†

According to the zoological classification now adopted by naturalists, the Beaver is placed in the order Rodentia, sub-order Simplicidentata, and belongs to the *Sciurormorphæ* or Squirrel section of that suborder, forming the family *Castoridae*, genus *Castor*, of which two species are recognised: the European Beaver, *Castor fiber*, confined to the temperate regions of Europe and Asia from France to the River Amoor; and the American Beaver, *Castor canadensis*, ranging over the whole of North America from Labrador to North Mexico.

Whether these two are really distinct species, or merely geographical races, is a question upon which opposite opinions have been expressed, Prof. Blasius,‡ for example, and Prof. Brandt§ stating that they cannot with certainty be separated; while Sir Richard Owen|| and Professor Newton¶ maintain a contrary view. Messrs. Coues and Allen treat them as well-marked subspecies.**

* Darwin, 'Naturalist's Voyage round the World,' p. 49.

† "Extinct species of *Castor* range back from the Post-pliocene to the Upper Miocene in Europe, and to the Newer Pliocene in North America. Extinct genera in Europe are *Trogontherium*, Post-pliocene and Pliocene; *Chalicomys*, Older Pliocene; and *Steneofiber*, Upper Miocene. In North America *Castoroides* is Post-pliocene, and *Palæocastor* Upper Miocene. The family thus first appears on the same geological horizon in both Europe and North America."—Wallace, 'Geographical Distribution of Animals,' vol. ii., p. 234.

‡ 'Säugethiere Deutschlands,' p. 407. § Mem. Acad. St. Petersburg. vii. p. 43.

|| 'British Fossil Mammals,' p. 196.

¶ 'On the Zoology of Ancient Europe' (1862), p. 25.

** 'Monographs N. Amer. Rodentia.' 4to, 1877, p. 433.

In point of size, coloration, and general habits, it may be said that no material difference can be detected externally between the two forms, but there appears to be a peculiarity in the skull, which is sufficiently constant to warrant specific separation. This peculiarity lies in the relative length of the nasal bones, which occupy one-third of the length of the skull. If a transverse line be drawn across the base of the nasal bones, it will be found that this line in the European Beaver intersects the orbits, while in the American Beaver it usually intersects the antorbital processes. The latter species, then, is distinguishable by its shorter and slightly broader nasal bones.

The prevailing colour of the Beaver's fur is reddish brown; rarely black; still more rarely white or particoloured. Hearne states that in the course of twenty years' experience in the countries about Hudson's Bay, though he travelled 600 miles to the west of the sea coast, he never saw but one *white* Beaver skin, and that had many reddish and brown hairs along the ridge of the back, the flanks being of a glossy silvery white.* Prince Maximilian states that *white* Beavers are occasionally found upon the Yellowstone River.†

The habits of the European and American Beavers are so similar that a description of those of the one might apply to those of the other, although it is remarkable that in parts of Europe where the animal is threatened with extermination it has so far modified its habits as to avoid building huts or "lodges," as they are termed, which would too readily betray its haunts, and prefers to live in holes in the river-bank (like a water vole), from which it is only expelled by the incoming water when the river rises, when it excavates a fresh cell at a higher level, and only as a last resource builds a hut upon the bank.‡ They frequently throw up dams across the streams frequented by them. These dams, which are destined to keep the water of variable streams up to the necessary height for the convenience of the Beaver, are wonderful pieces of work, and almost justify

* 'Hearne's Journey to the Northern Ocean,' p. 241 (1796),

† 'Travels in North America,' p. 332 (1843).

‡ It may be observed that the specific name *fiber* bestowed upon the European Beaver is derived from *fibrum*, denoting the edge or margin of the water wherein the animal loves to dwell, the generic name *Castor* being the Greek *Καστωρ*.—Herodotus, iv. 109; Aristotle, viii. 5, 8.

the marvellous stories told of its intelligence and sagacity by the older writers. They are often of great length—sometimes 150 or 200 yards and more—and run across the course of the brook inhabited by the Beavers,—sometimes in a straight line, sometimes in a curved form, according to peculiarities in the ground or the stream, and the exigencies of the engineers. They are composed, like the “lodges,” of lengths cut from the trunks and branches of trees, filled in with smaller sticks, roots, grasses, and moss, and all plastered with mud and clay in a most workmanlike manner, until the whole structure becomes quite water-tight. Their height is from six to ten feet, and their thickness at the bottom sometimes as much as double this, but diminishing upwards by the slope of the sides until the top is only from three to five feet wide. These dams convert even small rivulets into large pools of water, often many acres in extent; and in districts where Beavers abound these pools may occupy nearly the whole course of a stream, one above the other, almost to its source. Their use to the Beavers, as constantly furnishing them with a sufficiency of water in which to carry on their business, and especially to float to their “lodges” the tree-trunks necessary for their subsistence, is easily understood; but it is a more remarkable circumstance that by this means the Beavers exercise a considerable influence upon the external appearance of the locality inhabited by them, which may persist even long after they have themselves disappeared. In and about the pools the constant attacks of the Beavers upon the trees produce clearings in the forest, often many acres in extent: at the margins of the pools the formation of peat commences, and under favourable circumstances proceeds until the greater part of the cleared space becomes converted into a peat-moss. These peaty clearings are known as “Beaver-meadows,” and they have been detected in various countries where this animal is now extinct.

That the Beaver once existed in the British Islands, even within historic times, is a fact which renders it all the more interesting to us. It is mentioned in the Welsh Laws made by Howel Dha (A.D. 940), where the value of its skin is fixed at 120 pence, the skin of a Marten being at that date only 24 pence, and that of a Wolf, Fox, and Otter 8 pence.

Giraldus Cambrensis, in his description of his journey

through Wales in 1188, tells us that the Beaver was found in the River Teivi in Cardiganshire, and gives a curious account of its habits, derived apparently from his own observation. There is some reason for supposing that there were other rivers in Wales besides the Teivi which were frequented by the Beaver, as I have pointed out more fully in my 'Extinct British Animals' (pp. 36 - 39); and Boethius, the Scottish historian, writing in 1526, enumerates the Beaver amongst the wild animals found about Loch Ness. It is to be regretted that the written records which we have of its former occurrence in Great Britain are so few and fragmentary, but abundant evidence of its former existence in this country at a date long anterior to these historical notices is supplied by the remains of the animal which have been exhumed in various places both in England and Scotland.*

Many places in England seem to indicate by their names the ancient haunts of this animal; such, for instance, are *Beverley* in Yorkshire, *Beverage* in Worcestershire, *Bevercotes* in Nottinghamshire, *Beverstone* in Gloucestershire, and *Beverbrook* in Wiltshire.

In Ireland the Beaver was not only unknown in historical times, but there is no evidence of its having been found there in a fossil state.†

In HOLLAND, according to Streso, a Dutch writer, the Beaver was killed for food in the time of the Crusades, and he repeats the old story that, being an amphibious animal, its tail and paws were allowed to be eaten on fast-days.

According to Baron Dunoyer de Noirmont, the last Beavers were killed in Holland in 1825.

FRANCE.—Although no author of antiquity makes any special mention of the Beavers of Gaul, in default of other evidence the names of several rivers and different localities in France sufficiently testify to the fact of its having been once locally abundant there.‡

* 'Extinct British Animals,' pp. 42, 43.

† See Leith Adams, "On Recent and Extinct Irish Mammals," Proc. Roy. Dublin Soc., 1878.

‡ Amongst others, for example, the following are mentioned by Baron Dunoyer de Noirmont in his excellent 'Histoire de la Chasse en France' (tom ii. pp. 112, 113): the river and village of *Bièvre*, in the environs of Paris; another river *Bièvre*, in the Département de la Meurthe; *Bièvre*, in

Numerous remains of Beavers have been found in the peat-bogs of la Somme, where a few of these animals still lingered until a comparatively recent period.

The Carolingian Kings, in their great hunting establishments, maintained a certain number of *beverarii*, as they were termed, or Beaver hunters, employed to capture these animals for the sake of their fur, which was always held in high estimation.

In the 18th century a few existed on the banks of the lower Rhone and its tributaries, especially the Gardon and the Cèse. The inhabitants of that district declared constant war against them in consequence of the great damage they did to the willows and osiers, which were then the principal source of profit to the riparian landowners, and they were either shot or taken in snares. The rivers just mentioned must be regarded probably as among the last haunts of the Beaver in France. Chenu states that specimens have been procured near Arles, Beaucaire, Tarascon, and even Avignon, and still existed, he said, in such numbers as to elicit his surprise that some authors should have referred to it as extinct in France. Of two which F. Cuvier had alive, one was from the Danube, and the other from the Gardon, in Dauphiny.

Some ten or twelve years ago there was a Beaver from the Gardon living in the Jardin des Plantes, Paris; and a few years before that (in 1856), another, which had been killed in the Département de Vaucluse, was forwarded to the Editor of the 'Journal des Chasseurs,' who presented his readers with a figure of it. In the same Département, at the Chateau de Caderousse, may be seen some stuffed Beavers which were killed in that neighbourhood.

In the latest work in which any mention is made of Beavers in France,* the author, the Marquis de Cherville, states that a few still exist on the banks of the Rhone and its affluents, particularly the Gardon; and that some have been met with also in the marshes of Picardy. A Paris naturalist, M. Deyrolle,

Laonnais; *Beuvron* in Sologne, and *Beuvronne* in Brie; *Beuvron* in Auge, and *St. James de Beuvron* in Normandy; *Beuvry*, le Nord and Pas de Calais; *Beuvray*, near Autun, &c.

* De Cherville, 'Les Quadrupèdes de la Chasse. 8vo. Paris, 1885. pp. 173—177).

showed him a recent skin of a Beaver from the Rhone, which, notwithstanding the zeal of his correspondents, he had been two years trying to procure.

In SPAIN, according to some of the old writers, the Beaver was at one time to be found; but I have been unable to collect any details of its former distribution in that country, nor to discover at what period it became extinct there.

In GERMANY, at the close of the last century, many localities are reported to have been frequented by Beavers; for example in Mark, especially in the Altmark and Preignitz, and in the Middle Mark; also in the rivers Spree and Havel, in the vicinities of Berlin, Potsdam, Oranienberg, Liebenwalde, Trebbin, Nauen, and Königshorst.

Bechstein, writing in 1801, tells us that on the Elbe, near Kähmert, the property of the Prussian minister Schulenberg, there were then many Beavers, which constructed dams on the side channels or arms of the river where there was calm water. Near Wittenberg also they lived in societies and formed dams. In the vicinity of Kettinghausen, on the Lippe, they built their dams, and were found in some numbers, as well as higher up the river in the territory of Paderborn. In these localities their habitations are stated to have been so skilful as to rival those of Canada, though the colonies were less numerous. The trees they cut down were willows and poplars.

Oken mentions a Beaver-hut on the Yesil, in the duchy of Cleves, which stood six feet high, with two chambers, one above the other, the upper having three and the under one four cells; and he refers to a paper by Meyerinck in the Berlin Nat. Hist. Transactions for 1829,* describing a colony, settled for upwards of a century on the little River Nuthe, half a league above its confluence with the Elbe in a sequestered canton of the district of Magdeburg. In 1822 it contained from fifteen to twenty individuals: they had burrows, built huts eight or ten feet high, using trunks and branches of trees along with earth, and constructed a dyke.

Martius, writing in 1837, speaks of colonies on the Amper, which were still tended as objects of forestry or huntsman's craft.

* Verhandl. Gesselsch. Naturf. Freunde zu Berlin, 1829, Bd. I., pp. 325—332.

Wagner, writing in 1846, mentions the Beaver as occurring not only on the Danube, but on the Amper, Isar, Iller, and Salzach, tributaries of that river, as well as in the Elbe and Oder; while in other rivers it had then only recently disappeared. Only forty years ago it was to be met with on the Amper, a Bavarian stream, a tributary of the Isar, and on the Moldau, a river of Bohemia, which falls into the Elbe. In the former they sometimes descended to the junction, and in the latter they were found chiefly in the great forest of Wittingau, belonging to Prince Schwartzenberg, who strictly preserved them,* though occasionally, but very rarely, its tracks were to be seen on the sands of the low islands near Prague.

The Brothers Stuart, writing in 1848, thus refer to the Beavers of the Moldau:—"The varieties of wood and lake game in the moorland forests of Wittingau unite a diversity of sport rarely combined in the same range; but the most interesting of their productions are the Beavers, which are to be found in no other part of the Austrian states, and here breed principally on the Neulach, the Miser, and the Luschnitz, tributaries of the Moldau; they live in single families far removed from each other, as the stronger always expel the weaker from their neighbourhood. They are now (1848) strictly preserved, but as the streams which they inhabit are march waters (*i. e.*, boundaries), their numbers are continually diminished by the people of the neighbouring seignories. . . . The Moldau Beavers subsist on the bark of trees, preferring the aspen and willow, but eating also that of oaks and fruit trees."

In North-Western Germany, Beavers existed formerly in the Moselle and the Maas. Blasius asserts that a Beaver was captured in Brunswick, in the Schunter, at the end of the last century; that fifty years later they were observed on the Lippe in Westphalia; and that when he wrote (in 1857) they were still to be found on the Elbe between Madgeburg and Wittenburg, though the colonies since 1848 had become greatly reduced. He adds that they had been then lately observed on the Havel and Oder, in the Altmark.

A correspondent of the 'Cologne Gazette,' writing from

* Liebhich, 'Compendium der Jagdkunde.' 8vo. Wien, 1855.

† 'Lays of the Deer Forest,' vol. ii. p. 216; and Append., p. 447.

Wittenberg in February, 1878, remarked that the Beaver, which had become so scarce in Germany, had again taken up its abode near the village of Wittenberg, and that four pairs had been then recently counted in an old channel of the river. Below the village, towards the Anhalt frontier, several Beaver dams had been discovered, but the animals themselves, though betraying their presence by cutting down willows and other trees, were seldom seen out of the water. The fishing on this stream belonging to the Crown, strict injunctions were given to the inspectors not to molest the Beavers, which were accordingly well protected. It would be interesting to know whether they are still there.

IN SWITZERLAND, in the 16th century, Beavers were to be found in the Aar, the Limmat, and the Reuss, and up to the last century a few still lingered on the banks of the last-named stream, on the Thiele, and the Byrse.*

According to Sir John Lubbock, a few survived until the beginning of the present century in Lucerne and Valais.†

IN LAPLAND some of the last Beavers were killed by persons spearing fish at night with torches. The late Mr. John Wolley took great pains, during his sojourn in that country some five-and-twenty years ago, to ascertain particulars of its history, and he obtained from an old man the skull of the very last Beaver known to have been killed within the Arctic Circle some twenty-five years previously (about 1835), and which had been preserved as a curiosity in his cottage. This specimen is now in the Museum of the Royal College of Surgeons.‡

As regards NORWAY and SWEDEN, little or no accurate information concerning the present distribution of the Beaver in that country was forthcoming until Mr. A. H. Cocks, in 1880, detailed the result of his search for it there. Lilljeborg,§ Nilsson,|| Blasius,¶ and Giebel,** had stated vaguely and in

* Troyon, 'Habitations Lacustres,' and von Tschudi, 'Das Thierleben der Alpenwelt.'

† Lubbock, 'Prehistoric Times,' 2nd ed., p. 200.

‡ Newton, 'On the Zoology of Ancient Europe,' p. 25.

§ 'Sveriges och Norges Däggdjuren,' 1874, pp. 346—382.

|| 'Scandinavisk Fauna' (Däggdjuren), i. pp. 409—427.

¶ 'Säugethiere Deutschlands,' 1857, p. 407.

** 'Die Säugethiere,' 1852, p. 619.

general terms that the animal was still common there, but gave no particulars. Bowden in his 'Naturalist in Norway,' 1869 (p. 73), says:—"The Beaver was formerly very common in Norway, and was principally found in Soloer, Osterdalen, Gudbrandsdalen, and Jemteland; there is still a 'Bøever-dalm' and a 'Bøever-elv' in Osterdalen." He adds, "It is now only to be met with on the estate of a Mr. Aall, a gentleman who resides near Arendal, in the south of Norway."

Mr. Cocks was informed that in the neighbourhood of Osterdal, in the Slem Aa, a tributary of the Rena Elv, the last Beaver was killed about 1855; but he ascertained the existence in 1880 of at least three colonies in other parts of the country, and of these he has given an interesting account in 'The Zoologist' for 1880 (p. 233), suppressing only the names of the exact localities, for the better protection of the colonists. Some further particulars on this subject, gleaned during a second visit to Norway, are given in a subsequent article in the same volume (p. 497), and Mr. Cocks sums up (p. 501) by expressing his opinion that in 1880 there were probably not sixty adult Beavers in the whole of Norway.* When in Christiania, in October, 1884, he saw an adult male Beaver, in the flesh, which had just been shot at the principal colony in the South of Norway; it measured 3 ft. 4 in.; tail, 10 in.; and weighed 39 lbs. 10 ozs.

In Sweden he had only heard of two districts where it was possible that Beavers might still exist, but on visiting these in the autumn of 1881 he could not learn that any had been heard of for about thirty years (Zool. 1882, p. 15).

Very few remains of this animal are to be found in the Museums of Scandinavia. At Trondhjem, for example, there are only three or four broken pieces of jaw, and the skin of a tail; at Stockholm there are three stuffed specimens from Sweden and Germany, and at the Göteborg Museum there is no European specimen to be found.

In the tomb of an ancient Lapp, opened about thirty years ago at Mortensnæs, on the Varangerfjord, in the extreme north-

* Prof. Collett, of Christiania, in an article on the Beaver in Norway, published in the 'Nyt Magazin for Naturvidenskaberne' (1883, Bd. 18, Hefte 1), estimated the number of Beavers in Norway at that time to be about a hundred, and he did not consider that they were decreasing. It is satisfactory to learn that they are now being protected by law from destruction.

east of Norway, were found three Beaver's teeth, and a rude stone hammer, bearing marks of use, lying by the side of a human skeleton.* This discovery is of peculiar interest to the archæologist and ethnologist, as supplying another of the many interesting examples of analogies in the resources of primeval arts; for we know that the Beaver-tooth with its broad and sharp edge furnished the American Indians with one of his best cutting instruments previous to the introduction of iron tools. Dr. Richardson states that the incisor-tooth of the Beaver fixed in a wooden handle was used by the Indians of the North-West to cut bone, and fashion their horn-tipped spears and arrows till it was superseded by the English file.

IN DENMARK, as we learn from an interesting report by Prof. Steenstrup,† remains of the Beaver have been found in the peat moss of Christiansholm, and in Fyen; previously discovered traces of it within Danish territory, having been limited to Sjælland, where tree-stems from two to four inches thick with evident marks of Beavers' teeth upon them, have been found in the peat mosses of Mariendals and Brönsholm. When the Beaver became extinct in Denmark I have not been able to discover.

RUSSIA, LIVONIA, and POLAND, could all claim the Beaver amongst their indigenous Mammalia.

IN NORTH RUSSIA, according to Oken, Beavers were to be found on the Dwina, and the Petchora; and in the south, according to Demidoff, they were regarded as somewhat scarce on the Danube, but more common in the region towards the Caucasus; while at the date at which he wrote (1842) many had been killed in the districts watered by the Natanebi, and the Tereck.

In the Baltic province of LIVONIA, during the last century, Beavers were not uncommon, especially on the Middle Aa. About 150 years ago they built in the north of Livonia, on the Pernau and its tributaries, and occasionally on the Embach, but especially in Central Livonia, on the Aa, and in Sedde. They may also have occurred in Salis, and on the Duna and its

* 'Forhandlinger af Danske Videnskab. Selsk. Illustreret Nyhedsblad' (Christiania), 1856, p. 104.

† 'Oversigt over det Konigl. Danske Videnskabernes Selskabs Forhandlinger,' 1855, p. 381.

tributaries, the Oger, Perse, and Erst, in the south. Fischer in his 'Versuch einer Naturgeschichte Livlands,' 1871, states that in 1724 the colonies of Beavers there built dams of great height, and thereby greatly increased the inundations.

That the Beaver was formerly well known in those parts is shown by the number of places in Lettish Livonia that are named after it; for instance, the Beaver-beck and Beaver-court Estates; Beaver birch wood, Beaver brook, and Beaver hill.

Until the end of the last century the inhabitants of Sedde supplied castoreum to the druggists at Fellin, and so late as 1830 it was obtained from Walk, in the Aa district. But it would seem from the researches made by Herr von Loewis, who has published a very interesting article on the extinction of the Beaver in Livonia,* that since the year 1818 the Beaver has frequented only the Middle Aa. Solitary individuals, he says, may have strayed into other parts; but this is doubtful, since the Aa district of Walk is the only place where there is positive evidence of their occurrence.

In 1832, after an interval of two years, the druggists at Walk, received the last pair of "castorum sacs" from indigenous Beavers. They weighed 11 ozs., and realised 15 roubles, or 45 shillings per *loth*, i. e., half an ounce, in other words, £4 10s. per ounce. The owner had obtained them from a postilion at Stackeln, who had that year trapped the Beavers from which they were taken. For some years these were believed to be the last of their race in Livonia, until in the autumn of 1840, on the estate of Neuhoof, in the upper reaches of the Aa, east of Walk, a single Beaver was tracked and hunted, but without success. At length in the summer of 1841, on the borders of the Crown lands of Aa-hof, this sole surviving Beaver was shot by a gamekeeper named Neppert. It was veritably the last of its race, for since then diligent enquiry has revealed no traces of any Beavers in Livonia.

In SIBERIA, according to Wylie (Russian Military Pharmacopœia), the Beaver was at one time as common as it was in Russia; and in Western Siberia used to flourish on the Bobrofska, one of the affluents of the Irtysh. It is now, however, extinct

* 'Der Zoologische Garten,' 1878, pp. 353—357, translated in 'The Zoologist,' 1880, pp. 215—217.

there, but continues to survive on the rivulet Pelyin, from whence in 1876 M. Poliakoff procured five skins from an ostyack on the Obi, and commissioned a hunter to obtain some perfect specimens there for the Museum of the St. Petersburg Academy.* In Eastern Siberia, according to one of the most recent travellers who has given any account of the fauna of that country, Mr. Henry Seebohm, the Beaver has been extinct on the Yenesay for many years.†

The habitat of THE AMERICAN BEAVER is an unusually wide one, not surpassed by that of any other animal, including even the Deer and the Fox. It has been found from the confines of the Arctic Sea on the north, to the Gulf of Mexico, the Rio Grande, and the Gila rivers on the south, and even southward of these ranges in Tamanlipas in Mexico, which is the southernmost point to which it has been definitely traced. Throughout all the intermediate area, from Hudson's Bay and the Atlantic on the east to the Pacific on the west, it has been found generally distributed.

Numbers were to be found in the thickly-wooded country around Hudson's Bay, around the shores of Lake Superior, upon the head waters of the Missouri, and the Seskatchewan, and upon the tributaries of the Columbia. The regions bordering on the Yukon, on the upper part of Mackenzie River, on Frazer's River, and on the Sacramento were also noted for Beavers.

New England, New York, Pennsylvania, and the Canadas were less abundantly but very well supplied at the period of colonization. Southward towards the Gulf they were less numerous, and in the vast prairie area in the interior of the continent they were confined of course to the margins of the rivers.

With the commencement of colonization their habitat began to contract. They have now practically disappeared from the United States east of the Rocky Mountains, except in the States of Michigan, Wisconsin, Minnesota, and Iowa; and in the territories of Nebraska, Dakota, Idaho, Montana, and Colorado. They are still occasionally seen in Maine, New York, and Virginia.

In the Hudson's Bay territory, and in some portions of the Canadas, and west of the mountains in Oregon, Washington,

* 'The Zoologist,' 1877, p. 172.

† Seebohm, 'Siberia in Asia,' p. 43.

California, and Nevada they are still numerous, as they are also in Upper Michigan, on the southern shore of Lake Superior.*

Having glanced thus hastily at the past and present distribution of the Beaver in the Old and New Worlds, we may consider briefly the principal causes which in so many countries have led to its extermination.

In ancient as in modern times the Beaver was sought after for the same purposes, namely, for *dress, food, and medicine*.

From very early times its skin was considered a royal fur, and its acquisition when opportunity occurred, as in the case of the Marten and Ermine, was a prerogative of the Crown. We have seen how the Welsh Code of Howel Dha (A.D. 900) fixed a value upon the skins of 120 pence. Similarly the *Leges Burgorum* of David I. of Scotland (A.D. 1150) fixed the export duty upon the skins of Beavers along with those of Fox, Marten, and Wild Cat.

This Scottish Code is copied nearly *verbatim* from the laws and customs instituted for Newcastle-on-Tyne by Henry I., and confirmed by subsequent royal charters; and among the exports from the Tyne are specified the skins of Foxes, Martens, Sables [*i. e.*, probably Polecats], Beavers, Goats, and Squirrels.† Thus it appears that the Beaver was known in Wales in the 10th century, and its skins were exported both from Scotland and England at least till the middle of the 12th century.‡

When the indigenous British Beaver became extinct, and native skins could no longer be obtained, the fur, used for trimming and lining cloaks, had to be imported; but it was not until some time after the discovery of America that Beaver-wool became the indispensable material for the fashionable European hat. In 1638 Charles I. by royal proclamation prohibited the use of any materials except Beaver-wool in the manufacture of hats, unless made for exportation. This amounted to a declaration of war against the Beaver colonies in the North American settlements and Hudson's Bay Company's territories, and within

* Morgan, 'The American Beaver and his Works,' 1868, pp. 32, 33.

† 'Archæol. Inst. Newcastle; Memoirs of Northumberland,' vol. i., p. 27.

‡ In an Act of the first Parliament of James I. of Scotland, held at Perth in 1424, regulating the "custome of Mertrik skinnes and uther furringes," the Marten, Polecat, Fox, Otter, and other skins have their export duties specified; but the Beaver, which figured among Scotch exports in the reign of David I., no longer appears.

less than a century afterwards the animal was nearly exterminated in the country south of the St. Lawrence and the Great Lakes.

The French traders in 1743 imported into Rochelle 127,080 Beaver skins, and the British Hudson's Bay Company sold 26,750 skins the same year. In less than fifty years later, when Canada had become a British possession, the trade in Beaver skins seems to have reached its maximum, and to have been maintained with only a slight decline till the commencement of the present century. In 1788 upwards of 170,000 Beaver skins were exported from Canada, and Quebec alone in 1808 supplied this country with 126,927, which, at the estimated average price of 18s. 9d. per skin, would produce no less a sum than £118,944. The result of the continuance of such wholesale destruction may well be imagined. No wonder that in some places the animal became exterminated. and in others comparatively scarce.*

The additional persecution to which it was subjected, more particularly in Europe, for the sake of its flesh as food, and for the peculiar secretion known as castoreum, which was used medicinally, contributed still further to hasten its extermination in many places where it was once common. The convenient mediæval creed which converted the amphibious rodent into a suitable Lenten dish when flesh was forbidden no doubt added to the zeal with which the Beaver-hunt was pursued. It is asserted by ancient writers that only the tail sufficiently resembled fish to allow of its being eaten on fast-days; but certain modern authorities claim that the entire animal was *maigre*. On this point opinions differ.†

* After the substitution of silk for fur in the manufacture of hats, the value of Beaver pelts greatly declined; thus affording a respite to this persecuted animal, under the effects of which it is now increasing in certain localities. This is particularly the case on the Upper Missouri, and in the great forests around Lake Superior; but it is not at all probable that they will ever recover in any locality their former numbers. In 1862 Beaver pelts were worth at Fort Benton, on the Upper Missouri, one dollar and a quarter per pound, against seven and eight dollars per pound fifty years ago. They are now worth two dollars per pound on the south shore of Lake Superior. An ordinary pelt weighs from a pound and a half to a pound and three-quarters.—Morgan, 'American Beaver,' p. 228.

† See Dunoyer de Noirmont, 'Histoire de la Chasse en France,' vol. ii., pp. 113, 114. Rolland, 'Faune Populaire de la France,' p. 68.

With regard to the *castoreum* so long known to the ancients, and at one time so valuable that it fetched 40 roubles or £6 an ounce, a few words may be said. It is simply an odorous animal product analogous to musk and civet (though at the present much less familiar than these are), secreted and carried into two little glands or sacs placed near the root of the tail on its under side, and situated just above a pair of smaller oil-glands. These sacs are formed of several layers of connective tissue, lined by a delicate membrane, which is coloured by the secretion. The *castoreum* is light or dark yellow in different cases, soft, adhesive and gritty from the presence of calcareous matter, and has a strong peculiar odour. Under the microscope it shows granular and epithelial matter, and spherical crystals of carbonate of lime. The European *castoreum* is supposed to contain a larger proportion of the volatile oil, castorin and resin, and probably its superiority as a medicine depends upon the resinoid element.

Castoreum may be regarded as the prototype of "Holloway's Ointment" or "Cockle's Pills," for it was supposed to cure half the diseases under the sun. Pliny, for example, tells us (Book 32, chap. 13) that it was employed for the cure of vertigo, spasms, affections of the sinews, sciatica, paralysis, epilepsy, as a neutraliser of aconite, as an antidote to white hellebore, as a cure for tooth-ache (when mixed with oil and injected into the ear on the side affected), and as a remedy also for ear-ache. He adds that "applied with attic honey in the form of ointment it improves the eyesight, and when taken with vinegar it arrests hiccup." What more could be desired? At the present day, of course, its use has been superseded by other medicines, doubtless much more efficacious in their operation. Had these only been discovered a little earlier, the Beaver might still be roaming in haunts where the importunities of druggists have now caused its extinction.

There is just one more point to which, before concluding these remarks, I can hardly forbear to allude, and that is the highly interesting fact that the Beaver has produced its young in the Zoological Society's Gardens. It might be supposed that this circumstance would have furnished opportunity for many interesting observations in regard to the number and condition of the young at birth, their rate of development, and so forth; and might have resulted in the elucidation of certain points of

importance which are still undetermined. To one such point only I will allude, namely, the condition of the young at birth. It is a very remarkable fact that in the Rodents this differs considerably in different species. Take the case of two such familiar animals of this order as the Hare and Rabbit. Young Rabbits are born blind and nearly naked, and remain in this helpless condition for at least ten days or a fortnight; young Hares are born clothed with fur, and with the eyes open; and are able to run about and feed on the second day after birth. This curious difference is doubtless correlated with the different conditions under which the two species are placed at birth, young Rabbits being born under ground and in the dark, while young Hares are produced above ground in a "seat" or "form," as it is termed, and exposed to the light of day.

How is it with young Beavers? At the present moment I am unable to say. I have consulted a great number of works in which reference is made to this animal without being able to discover any information on this point, and conclude therefore that the question has not yet been answered in print, although to those who have hunted and trapped Beavers, or studied them in their proper haunts, it must doubtless be known. Mr. Bartlett informs me that on the occasion of the birth of young Beavers in the Zoological Gardens the animals were so exceedingly shy, rarely showing themselves except at night, that it was impossible to ascertain either the number, or condition of the young; and whenever a young one made its appearance, it was immediately carried back to its lodge by the old one. We know, however, from other reliable sources that the number of young in a litter varies from two to five, and very rarely six.* They live with their parents until the following spring, when they are driven away to shift for themselves.

Within the last ten or twelve years, as most people are probably now aware, the Beaver has been locally reintroduced into Scotland by the Marquis of Bute. In 1874 a space of between three and four acres was enclosed in a wood on the Island of Bute, and four Beavers were turned out. The following spring seven others were liberated, and they have since increased and

* Hearne, 'Journey from Prince of Wales's Foot to the Northern Ocean,' 4to, 1725, p. 226. Morgan, 'The American Beaver and his Works,' 8vo, 1868, p. 314.

are thriving. The keeper who has charge of them, Mr. G. S. Black, published in 1880 a very interesting account of their doings. This is quoted in full in my work on 'Extinct British Animals' (printed the same year), in which will be found a great deal more information concerning the British Beaver than it has been possible for me to detail on the present occasion.

NATURAL HISTORY AND SPORT IN THE HIMALAYAS.

BY SURGEON-GENERAL L. C. STEWART, F.Z.S.

WITH three weeks' leave of absence, I started from Kussowlie at dawn of day, October 1st, *en route* for the mountains beyond Simla, on ornithological pursuits intent. Kussowlie, a pretty military cantonment in the N.W. Himalayas, where my regiment was stationed, has an elevation of about 7000 feet, and is situated on the first range of the Himalayas from the plains, one stage of eight miles from Kalka, at the foot of the hills. Simla is about thirty-three miles distant N.W. by a good bridle road.

During the year I had passed at Kussowlie I had been pretty busy collecting, and had a tolerably good assortment of hill-birds, chiefly, however, the summer residents and denizens of the lower ranges; and I was anxious to collect in the higher mountains, and particularly in the pine-forests beyond Simla. In these days I was in constant correspondence with Blyth, in Calcutta, who at my request had sent me a good birdstuffer in the shape of a young Portuguese of his own training. Gomez was his name, idleness and lying his nature; but he was excellent in his own department of skinning birds, &c., and preparing skeletons. I had as a companion for the trip Capt. T., of a native infantry regiment then on leave at Kussowlie, a good shot, and devoted to Ornithology; and it was arranged that he should join me a stage or two beyond Simla. As there were staging or "Dawk" bungalows all the way to Koteghur, which, as far as we knew, was to be our *ultimatum*, we did not encumber ourselves with tents or superfluous baggage. We took most of our supplies from Kussowlie and there engaged our hill porters, sending them on ahead under a trustworthy servant of T.'s. Mr. Gomez accompanied the party, bestriding a screaming and fractious bazaar pony, and they were to await my

arrival at Mahassoo, the first stage beyond Simla, where my friend Capt. H. had a beautiful cottage, and had promised to put me up. I had engaged to reach Simla in time for a late breakfast at Rockbank, a house which the officers of my regiment had rented for the season, and to which they used to resort in parties for a few weeks at a time, according as they could get leave of absence from regimental duties.

Kussowlie itself is rather a slow place. We had it all to ourselves most of the year, but during the gay and festive Simla season we used to be enlivened by lots of visitors passing through. I reached my destination in due course by means of half a dozen ponies "laid on" at every six or seven miles, and after breakfast proceeded to an emporium to make sundry purchases, including a good supply of ammunition; and my friend Major L. made me take his rifle on the chance of my falling in with big game, although I had not intended encumbering myself with one. The road from Kussowlie descends for a mile and a half by a series of steep zigzags, and then there is a pretty level stretch for several miles; and as I sauntered along I did not much look out for birds.

Below the road branching off to the Lawrence Asylum, at Sunawur, I disturbed a party of eight or a dozen of the handsome Himalayan Blue Pie, *Psilorhinus occipitalis*, which were making a great noise about something as they flew to and fro across a wooded ravine. I pulled up to watch them for a minute or two, when, as if by common consent, they closed in, left off their screeching, and sailed away in single file; displaying to advantage the beautiful different shades of blue on wings and body, and long graduated white-tipped tails. It is the handsomest of the Jay or Magpie tribe in these hills, not yielding the palm for beauty to the lovely *Cissa venatoria* of the eastern countries. As I rode along the river-side, near the suspension bridge at Hurreepore, I noted two species of Redstart, *Ruticilla leucocephala* and *R. fuliginosa*, and the ubiquitous *Ceryle rudis*, but no other Kingfisher. Jays of both species, *Garrulus lanceolatus* and *G. bispecularis*, abundant in the woods. *Leiothrix luteus* in small parties, picking up what they could get on the road, and hardly getting out of the way. Several kinds of *Garrulax*, in suitable localities; and on the grassy slopes about the road a Finch or two, which I could not identify, and an Accentor, probably *A. variegatus*. Noisy parties of the Mountain Parrakeet, *Palæornis schisticeps*, swept past over-

head, and the cooing of Doves and the tapping of an occasional Woodpecker were not wanting.

Riding up the last long and beautiful ascent to Simla, I came into the region of the *Rhododendron arboreum*, now rather an ugly tree. The last time I was there was in its flowering season, when the whole hill-side seemed on fire,—a blaze of splendid crimson blossoms; and many of the trees covered with the climbing wild white rose, *R. Brunoni*. Numerous birds of many species and much interest appeared on the scene, among which I identified, as I rode along, several species of *Parus*, *Turdus castaneus* and *T. atrigularis*, a *Sitta* and a *Certhia*, a black and white Woodpecker, *Picus Macei*, and a large green one, *Gecinys squamatus*. The only raptorial birds I spotted in my ride were some Kites below the barracks at Subathoo, a Bearded Vulture or two sailing along the face of the hill at Keeree, several of the Great Himalayan Vulture, *V. fulvus*, and a pair of the Tawny Eagle, *A. fulvescens*; and I heard the scolding of a family of Owls, probably *Athene radiata*, as I rode down the Kussowlie Hill.

I had nothing to do at Simla beyond the purchase of a few stores and my ammunition, so I set off directly after my late breakfast for Mahassoo, distant eight and a quarter miles. I noticed several desirable birds *en route*, but, as I had not my gun with me, they were safe. *Hypsipetes psaroides*, whose native name is Bun-Bukree, or Forest Goat (may be from its voice), is particularly at home hereabouts, and rather a wearisome bird from its incessant squawking. An allied species is found on the Nilgherries, also most vociferous. A small Falcon, I believe *F. subbuteo*, alighted on a tree close to me, and several Kestrels scoured the valley or hovered above it. There was a Shrike, which I made out to be *L. tephronotus*, and now and then a Drongo Shrike, *Dicrurus longicaudatus*. I got another species, *D. cærulescens*, a few days on at 4000 ft., and I do not think it goes much higher. The pretty *Ruticilla cæruleocephala*, the only Redstart observed, and that sparingly, on bushes by the roadside. It is very common at Kussowlie in winter, but disappears for higher elevations the beginning of summer. Jays and Laughing Thrushes as usual, and *Pari* in the oak trees. *Siva strigula* in small parties, and *Leiothrix luteus* in larger. I saw a Wall Creeper, *Tichodroma muraria*, on a cliff above the road; this pretty bird breeds on the hills, and visits the plains—the

Punjab at least—in the cold weather. Just at dusk I put up a Goatsucker at the road-side, and regretted for its sake I had not my gun; I believe it was *Caprimulgus monticolus*.

Near dusk we reached Capt. H.'s house, for I had more than once lost my way and been misdirected. I found that my host had that morning gone into Simla, but was expected back to a late dinner; so after a bath and change of raiment I summoned Mr. Gomez, and made him give an account of his proceedings during the week, for, as I have already said, I had sent him on ahead from Kussowlie with a spare gun, and had instructed him as to what in particular I expected, and wanted him to procure for me. He had been out in the forest daily, and had gathered together really a creditable assortment of birds; and had furthermore engaged, subject to my approval, a well-known Shikaree. I soon made terms with the man, and he proved a valuable addition to our party. He was a very fair shot, and could preserve large birds or mammals. He knew every inch of the country all around; moreover, he promised to introduce me to *Monaul* and other game, and he was as good as his word. He would not take permanent service, though I would gladly have disbanded Mr. Gomez, and enlisted him. However, he preferred a life of greater freedom, and had a wife and other encumbrances. I found him faithful and honest, and we became friends in our way very soon. He sent me afterwards many good contributions, birds and beasts, and refused payment, till I forced it on him. I also supplied him liberally with ammunition and arsenical soap. He came to Kussowlie next spring to see me, and a trip was arranged for the far interior. I gave him a single barrel gun for some good heads he had preserved during the winter,—Tahr, Serow, Burrell, &c.,—and which he had brought to present to me. Poor Oosrao! that was the last I ever saw of him, for I heard of his death by small-pox a month afterwards, to my great regret.

To resume. Mr. Gomez's spoils included several examples of species new to my collection, although I afterwards got duplicates of most of them:—(1) The black and yellow Grosbeak, *Coccothraustes icterioides*, I had never before seen, but recognised it readily; and I got altogether ten specimens of it during the trip. It is most partial, as far as I have seen, to the pine-clad mountains, and is consequently common at Mahassoo. I found it also at

Koteghur, busy in the apricot orchards, where it is voted a nuisance, as it destroys and wastes much of the fruit for the sake of the kernels. Of the other two Himalayan species of Grosbeak, *C. melanoxanthus* is said to extend to Darjeeling, and *C. carnipes* is limited to the S.E. Himalayas. I have never observed either of them myself. Some years afterwards, on looking over a collection of birds belonging to Major Blaggrave, of the Trigonometrical Survey, I found some examples of a large Grosbeak which seemed different from any of the above-named, and which had been shot in the hills beyond Murree, in the far N.W. On sending them to Calcutta they were pronounced new, and named by Blyth *C. affinis*. (2) A fine fishing Owl, *Ketupa flavipes*. (3) *Aquila Bonelli*, as it now stands, but known by many other scientific names; this was a very fine adult female. (4) A small horned Owlet, probably *Scops lettia*, a dark grey specimen. Is it only a variety of the chestnut phase of plumage? This pretty little Owl had been shot only that evening, and was untouched; the irides were dark brown. (5) The only other novelty was a remarkably large Field Lark, *Mirafra*, which seemed to differ from those described in being unspotted grey above, and pale fiery red below. Capt. T. did not know it, so I laid it aside to send to Calcutta for identification; but somehow that was mislaying it, and eventually I know not what became of it. I believe it was a new species. Gomez said he shot it on the bare hill-side, half-way from Simla. The Shikaree had that morning shot a brace of Kalij Pheasants, and a Kakur, or Barking Deer. As I was pretty well done up after a thirty-two mile ride and an eight mile walk, I dined on what I could get; and so to bed, without seeing Capt. H. till the morning.

Mahassoo, Oct. 2nd.—For the first time this morning I heard and then saw the Himalayan Nutcracker, *Nucifraga hemispila*, which is very common in the pine-forests. I never saw it elsewhere, and it is unknown at Kussowlie or Landour; but abounds here, flying about in pairs or small parties. I recognised its loud discordant voice before I was out of bed. Capt. H. says it breeds in the pine-forest, building a nest of small twigs, lined with fir-needles and bits of moss. He had not taken the eggs, however. Another fine Nutcracker, *N. multimaculata*, has been brought from Cashmere, but I have never seen it.

The situation of Capt. H.'s house is beautiful. Gigantic

deodars surround it on all sides, and the slopes of the hills used to be entirely covered with this stately tree. A good deal of the forest has lately been cut down, and the land thus reclaimed has been devoted to potatoes, which thrive remarkably well, and are much used by the hill-men, or taken for sale to the neighbouring stations; they are invariably roasted in the ashes by the Paharees, who have not yet taken to boiling them. I had never been in a forest of deodars before, and found its grandeur impressive; but there were few species of birds procurable, and on this account I was somewhat disappointed. There were two species of Green Woodpeckers, *Gecinus squamatus* and *G. occipitalis*, about equally common, and conspicuous by their harsh, rattling call, and their peculiar flight. I got also good specimens of other Woodpeckers to-day: *Picus Himalayanus*; *P. pygmæus*, which I more than once noticed in parties of half a dozen; and *P. brunneifrons*, which is probably the most common species. A single *Gecinus flavinucha* was observed, but I missed him. Several noisy parties of *Garrulax* were seen, but I did not ascertain the species, *G. erythrocephalus* and *G. variegatus* most probably. In a considerable clearing of the forest I came on a party of nearly a dozen of *Pomatorhinus erythrogenys*, busily turning up the fallen leaves and keeping up an animated conversation the while. This congregation surprised me, for they are usually found in pairs, as are the other species of the Scimitar-billed Babblers. It is a common bird all over these hills, so I only fired into the flock to verify my observation, knocking over a pair. A much prettier species is *P. leucogaster*, which keeps more to the lower ranges, descending to the foot of the hills in winter. A third, *P. Horsfieldi*, is restricted to the Nilgherries and the Western Ghats. They are common at Mahableschwur, and there go by the fancy name of "John and Mary," from the quaint answering notes of the male and female birds. *Sibia capistrata* was common in pairs. It is a lively neatly-plumaged bird, noisy, and by no means shy. I have never met with it off the hills, but *there* it has a wide range. I have several times brought it up from the nest, feeding it on plantain, guava, and other fruit.

In the afternoon, as I was toiling up the steep pine-clad hill towards the house, I heard the note of a Woodpecker, which sounded strange to me, for by much watching by eye and ear I was then pretty well "posted" in Woodpeckers, always a favourite

group with me. After a good while watching and peering overhead in search of the owner of this strange voice, whom I could not see, but whose talking I could hear, the bird flew off, but only to throw itself on the trunk of an adjacent pine. I secured it at once, and saw for the first time "in the flesh" a specimen of *Picus hyperythrus*, undoubtedly a rare bird, at least in this part of the hills. I subsequently got three more examples of it at long intervals. It is a handsome species, of medium size, and the coloration is unique among Indian Woodpeckers, being uniformly pale chestnut or bay-red below; the upper parts black, with white bars, like many others of its kindred. The male has the head fine crimson, and the female black, with pale streaks. This specimen was a male. Its particular note is hard to describe. Most of the tribe have a harsh rattling cry, usually uttered on the wing, or when about to alight or throw themselves on the tree-trunk they have selected. My bird's voice was of two notes, on an ascending scale and oft repeated, and void of the harshness characteristic of the cry of the green species or of its kindred with the black and white upper plumage. I observe that the learned have victimised this bird as the type of a new genus, "*Hypopicus*," for the same reason (?), good lack! that they have multiplied the genera of Spotted Woodpeckers into *Yungipicus*, *Leiopicus*, and so on. Is there any structural difference in this bird warranting its generic isolation beyond the somewhat slender bill? I once possessed specimens of eighteen distinct species of Woodpecker from Upper India and the Himalayas, and on referring to "the authorities" I find them allotted to thirteen distinct genera. This exasperating manufacture of genera is even worse in some other groups I could name.

My shot disturbed some large Wood Pigeons, which turned out to be the beautiful *Columba Hodgsonii*; they were very wild, but I secured a brace with green cartridges after some fatiguing stalking, and many more specimens on future occasions fell to my gun. The hill Shikarees constantly bring them in with other Pigeons, &c., for sale, and it was thus I secured my first indifferent specimens the year before at Kussowlie. The Himalayan Cushat (if it be distinct from the British bird) is found only in the N.W. Himalayas, where I have seen it in flocks on the gleaned harvest terraces below Kussowlie in autumn; and a Blue Pigeon, supposed to differ from the common kind abounding on the plains and named

C. rupestris, is said to occur hereabouts, but hitherto I have not obtained it. The only other true Pigeon of these parts is the White-backed, *C. leuconota*, which I got a few days later, further within the hills.

A curious little bird obtained to-day is *Ixulus flavicollis*. There was a small flock of them in a dwarf bamboo clump in Capt. H.'s garden, dodging about, and difficult to shoot, from their intense restlessness. It would seem to be more common farther to the east than with us. Its manners and customs are those of the Titmice. I kept a pair for more than a year in an aviary at Kussowlie, and they used to nibble at a bit of hard-boiled egg held up to them, and drive away Bulbuls and other birds of twice their size and fighting weight.

A Titlark, which I made out *Anthus arboreus*, is common hereabouts. I saw no other species at this elevation, but found another which Capt. T. pronounced to be *A. Richardi* at 4000 ft. I got a large Wren Warbler, *Suya criniger*, in some thick hedging in the garden, and in the same situation a little *Phylloscopus* whose christian name I know not to this day, and it agrees with none of Blyth's descriptions. But the best bird I got to-day was a solitary Himalayan Jenny Wren, *Troglodytes Nipalensis*, which very closely resembles the British bird, if it be not indeed identical. It was dodging about a broken-down wall behind the house. I never got above three or four others during many years of collecting.

Capt. H. advised me to be on the look-out for Flying Squirrels on the outskirts of the forest; but I came across none here, nor did the brave Gomez, although I believe he never went fifty paces from the house to look for them. However, I got several of them farther on during this excursion. This species, *Pteromys inornatus*, is at times, as I can testify, far from uncommon. A friend brought me, one winter night, six specimens of this beautiful creature, which he had shot one after another on some trees by the road-side at Landour. By his account there must have been quite a *flight* of them. His attention was attracted by the falling of acorn-cups and small twigs from the oaks overhead. On looking up he saw one, then another, and another among the branches. As his house was close by, he went for his gun, and the result was this unprecedented bag. It was in December, with a fine bit of noon. I have always myself found this species in

pairs, and rather shy. I never succeeded in keeping a Flying Squirrel for any length of time, even when brought to me half-grown. I have done my best to rear them, but they all pined away. The adults are savage and untameable, and bite viciously with their chisel-formed incisors. A still handsomer kind, magniloquently christened *P. magnificus*, belongs to the S.E. Himalayas, and I once, some years afterwards got a single individual of the grey kind, *P. fimbriatus*, on the Tyne range beyond Landour. This specimen I gave to the Calcutta Museum. Oosrao was out all day with one of Capt. H.'s men, and they brought in a Cheer Pheasant, three brace of Kalij, and a Kakur, or Barking Deer, shot close to the house. It was in very poor condition, and a tight ligature was found on one of its fore legs, evidently the fragment of a snare the creature had been caught in; so shooting it was a mercy. It was a doe, without horns. This was the only Kakur obtained hereabouts, as it avoids the pine-forests; but delights in tangled undergrowth, oak, or dwarf bamboo, jungle, and densely-wooded hill-sides. It is of universal distribution at moderate elevations, mostly found at about 4000 to 5000 ft.

(To be continued.)

NOTES AND QUERIES.

Davis Lectures, 1886.—A series of lectures upon zoological subjects will be given in the Lecture Room in the Zoological Society's Gardens, Regent's Park, on Thursdays at 5 p.m., commencing June 3rd, as follows:—June 3rd, "Pigs and their Allies," by Prof. Flower, LL.D., F.R.S.; June 10th, "The study of Zoology," by Dr. St. George Mivart, F.R.S.; June 17th, "Scorpions," by Prof. E. R. Lankester, F.R.S.; June 24th, "Beavers," by Mr. J. E. Harting, F.L.S.; July 1st, "Some of the ways in which Animals breathe," by Prof. F. Jeffrey Bell, M.A.; July 8th, "Eyes," by Mr. F. E. Beddard, M.A.; July 15th, "Swifts and Swallows," by Mr. P. L. Selater, F.R.S. These lectures will be free to Fellows of the Society and their friends, and to other visitors to the Gardens.

MAMMALIA.

Destruction of Wild Animals in India.—During the year 1885 wild beasts and snakes were unusually destructive to human life in the Central Provinces of India, there having been an increase of 262 in the number of

persons killed as compared with the preceding year. Of wild beasts, tigers, of course, were the most destructive, their victims numbering 110, against 98 in 1884, while the number of tigers killed was only 221, against 260. The deaths from snake-bite last year amounted to 1066, against 797 in 1884, while only 1997 snakes were killed, as compared with 2378. In an official note on the subject it is observed that there has been a "satisfactory increase" in the number of wild animals destroyed; but this increase is due to the larger number of bears, wolves, and hyenas killed.

BIRDS.

Pheasant, Partridge, and Wild Duck laying in the same Nest.—A few weeks ago a nest was found near here containing eggs of the Pheasant, Partridge, and Wild Duck. The fact of birds of such very different nature laying in the same nest seems worth mentioning. The eggs were eventually forsaken by all three species.—E. W. H. BLAGG (Cheadle, Staffordshire).

How the Spotted Flycatcher subsists in hard weather.—The severe weather during the second week of May caused considerable mortality among Swallows hereabouts. The observations on the subject (pp. 248, 249) are partially applicable to what occurred in this locality. But the Spotted Flycatcher, which is fairly plentiful here, did not come off quite so badly. I do not think its numbers have been lessened; but it was evidently hard pressed. On May 13th, after nearly forty-eight hours of incessant rain and cold wind, I observed one of these birds—so often associated with romantic situations—perched on the rim of a paraffin barrel. Its wings were drooping, and it seemed to be in a pitiable condition. It stuck to its post all the afternoon. Looking to it frequently, I found that it descended to the ground several times, and occasionally picked up something. Once I saw it pounce on an earthworm, which it devoured. If the fact of this bird feeding on a common earthworm is worth recording, will you kindly insert this note?—J. E. PALMER (Lyons Mills, Straffan, Co. Kildare).

[This little bird, so far as our observation goes, feeds almost entirely on winged insects and spiders. It must rarely happen that it is driven to take worms of any kind.—ED.]

Curious Nesting-place of a Pied Wagtail.—On asking a man who was with sheep on turnips if he had seen any nests, he replied that he had found a nest there the previous day on the ground, and that the bird had laid one egg in it that morning. I went with him to look at it, and was much surprised to find that it was the nest of a Pied Wagtail. There was a scratching in the ground, and in this the nest was placed close to the bulb of a turnip. The birds were running about close by, and there was

nothing to hide the nest, which was quite out on a flat open field; many nests of this species have come under my notice, but not one in so curious a position.—J. WHITAKER (Rainworth Lodge, Notts).

Ornithological Notes from Mayo and Sligo.—Notwithstanding the cold and late spring, the arrival of summer birds was not so much later than usual, but the harsh north-east winds kept them very silent for some days after their first appearance, especially the Chiffchaff, Willow Wren, and Whitethroat. I have frequently observed these birds flitting about the hedgerows perfectly silent as to song, but occasionally uttering their call-notes; and this season a Whitethroat attracted my attention by its harsh alarm-note three days before I heard one singing. The Sandwich Terns were the first of our summer visitors to put in an appearance on the 25th of March; two or three pairs were at first seen and heard, and were followed by the main flock a few days afterwards. The Chiffchaff was seen on April 1st, but I only heard its song once or twice that day; the bird appeared very much affected by the cold, flitting about the hedge very silently with its feathers ruffled up, and altogether looking very uncomfortable. On the 11th my friend Mr. E. Knox, of Palmerstown, saw Wheatears near Killala, and a Swallow on the 17th, though the latter bird did not appear in this neighbourhood until the 24th, and, as usual, an old male was the first to visit the nesting-place. I heard the Willow Wren on April 24th, the Cuckoo on the 27th, and Whimbrels were very noisy on the 28th. Common Terns were seen and heard on the 30th; and I heard the Whitethroat and Landrail at Killanly on May 5th. Swifts appeared on the evening of the 9th, and a solitary Spotted Flycatcher on the 13th, a day so bitterly cold that the little bird had to keep at the lee-side of a hedge for shelter, occasionally flying to the grass to pick up insects, being unable to stay on the trees, its usual haunt. Of all our summer visitors to this district, the Whimbrels are the most regular in the date of their arrival, for the record of the past nine years' observations show that their cry has been heard about here between April 28th and May 1st. Now, on the contrary, the Sandwich Terns are the most irregular, for I have noted dates of their arrival ranging from March 20th to April 30th. May 7th, being calm and bright, tempted me to launch my punt, and paddle round the estuary down the Moyne Channel to Killala Pool, in order to ascertain which of our winter visitors had delayed their departure to the northern breeding-grounds. On my way down I saw, on the Moyne Sands, a flock of about fifty Bar-tailed Godwits, and, although for a considerable time I watched them attentively through a good field-glass, I was unable to discover any bird exhibiting the red breast of the breeding plumage, all being in the grey winter garb. I also saw three Grey Plovers and about twenty Knots, all in the grey plumage, though in one of the latter birds (shot) two or three red feathers were just appearing between the grey of the

breast. Further down the channel nearer to Killala I saw about a dozen Sanderlings, all in the grey dress, and between thirty and forty Turnstones, several of which were assuming the breeding plumage, and one that I shot had very nearly attained the perfect summer dress. I also observed a large flock of Dunlins, the greater part of which were showing the black breasts and rusty-coloured backs of summer. When I reached Killala Pool a splendid pair of Great Northern Divers were fishing about it; one was in the winter plumage, but the other appeared to be in the full summer dress, the white ring round its neck appearing quite perfect, and, although I was anxious to obtain the bird for a friend's collection, I was unable to get within shot, it was so watchful. While paddling about trying to get a shot at the Diver, several Grey Seals came within half a shot of the punt, Moyne Channel, as far as Killala Pool, being a favourite haunt of Seals, especially during summer, where a small herd regularly haunt a sand-bank, where they congregate at low tide to rest and bask in the sunshine. One day some years ago I counted between twenty-five and thirty Seals, large and small, lying on that bank, but since then they have decreased in numbers, and seventeen is the greatest number I have seen assembled there of late years. On returning from Moyne past Bartragh to the eastern side of the estuary, near Scurmore ice-house, I observed a second pair of Great Northern Divers, which, as well as I could make out with my glass, were in the breeding plumage; and a little further on, near Moyview, three Red-throated Divers appeared, two displaying the red throats and plumage of summer. Cuckoos have been unusually numerous about here this season, while Whitethroats have been scarcer than usual.—ROBERT WARREN (Moyview, Ballina).

Notes from North Yorkshire.—In consequence, I suppose, of the cold and backward season many birds seem to be laying less than the usual complement of eggs. I have noted, amongst others, a Robin, Snipe, and Hedgesparrow, each sitting on three eggs; a Chaffinch and two Brown Owls, each sitting on two eggs. On April 30th some Green Sandpipers called here on migration. I am convinced this species breeds in some of the more secluded districts in this county. How else can we account for their regular appearance in spring, and their return towards autumn (invariably the second week in August) accompanied by their young? Were they breeding in another country they would hardly migrate N.W. up this river in spring *en route* to their breeding-grounds. Stock Doves are increasing in number, and seem to find a scarcity of suitable breeding-holes. My brother and I have already found three nests placed in the forks of ivy-covered trees in such a position as a Wood Pigeon chooses. Another nest in a bank side, two feet from the ground, in an open ploughed field. We found a Waterhen's egg in a hole in a dead tree eight feet from

the ground. There was no nest, but the old bird was sitting on the egg when we found it. The tree overhangs a small pond, which is in no way subject to inundations; but former eggs have been so often taken by farm-labourers, I suppose the old bird tried to find a safer place. On May 8th we found a Cuckoo's egg in a Pied Wagtail's nest, which had contained four eggs previously, but the Cuckoo had evidently turned them all out when depositing her own. This, doubtless, caused the Wagtail to forsake, at least she never sat again on the nest. For several years we have found the same type of Cuckoo's egg in a Pied Wagtail's nest in the immediate neighbourhood of the above-mentioned nest. A Chaffinch laid two eggs in a nest in an apple tree, but for some reason the birds became dissatisfied with the site, and, pulling the nest to pieces, built another with the old materials in a tree about fifteen yards distant. We watched them flying from one tree to another when changing quarters. The eggs, it may be presumed, were allowed to fall; they certainly were not transported. It is, of course, possible that it was another pair of birds which built the second nest. A pair of Blackbirds built a nest in the bottom of a fence. Some one found it, and, lifting up the top half with the lining, laid it by the side of the more solid under structure, formed of mud and roots. In this remaining half the eggs have been laid, and the bird is sitting on them. Fieldfares were here on May 8th. As I write (May 12th, noon) the thermometer stands at 38° F., and snow is falling heavily on the moors. The migrants seem to feel the cold very much, the Swallows being especially feeble, and perching in the willow bushes by the river in such a listless way that they could be knocked down with a short stick.—THOMAS CARTER (Burton House, Masham).

Grey Hen and Partridge laying in the same Nest.—On June 3rd I found a Grey Hen sitting on her nest, containing eight of her own eggs and six Partridge eggs. It may interest some of your readers to know this.—JAMES SARGENT (New Cumnoch, Ayrshire).

Albino Robin.—A friend of mine, Mr. Peckover, has lately shot an albino Robin, which is now being preserved. It was quite young, its tail being only about half an inch long; of a cream colour, with pink eyes.—KENNETH LAWSON (12, Harley Street, Cavendish Square, W.).

Breeding of the Lesser Redpoll.—In your extended review of the 'Birds of Cumberland,' you represent me as writing that "the Twite and Lesser Redpoll are characteristic moorland species." If you will refer to the paragraph on the latter species (p. 47) you will find that it is stated to be most strongly established in the north of the county from the Solway "to Brampton, at the base of the east fells." It is certainly quite the reverse of a "moorland" species, at least in my experience. It is true

that it occurs in moorland regions, such as Skye; but there one only finds it in juxtaposition to a cultivated or sylvan area. The following notes on the Lesser Redpoll may be useful to county faunists:—*Middlesex*.—One or two pairs usually nest in Highgate Cemetery, where my friend Mr. Vine took a clutch of eggs in 1884. *Surrey*.—A young bird was caught near Guildford on August 1st, 1885, and submitted to me for examination. *Devon*.—In July, 1879, Mr. Sladen and I observed an old bird feeding a nestling, on the branch of an ash, near Lynton. The fact of the Lesser Redpoll breeding irregularly in the southern counties is familiar to most of us, but records are scanty, and might well be increased by the readers of 'The Zoologist.'—H. A. MACPHERSON (3, Kensington Gardens Square, W.).

The Speed of Swallows.—An experiment to test the speed of the Swallow's flight has just been made at Pavia. Two hen birds were taken from their broods, carried to Milan, and there released at a given hour. Both made their way back to their nests in thirteen minutes, which gave their rate of speed at $87\frac{1}{2}$ miles an hour.

Wild Duck and Pheasant laying in same Nest.—A curious instance of two birds of very dissimilar habits laying in the same nest has just occurred here, *i. e.*, the Wild Duck (*Anas boscas*) and the Pheasant. About the middle of May I was told of a Wild Duck's nest containing thirteen eggs. On going to look at it some days afterwards I found the nest empty, the young ducks being hatched and gone. The egg-shells, however, were lying round the nest, and among these were two Pheasant's eggs, each containing a fully-developed chick, which would probably have come out in the course of another day. As the period of incubation of the Wild Duck is much longer than that of the Pheasant, these eggs must have been deposited in the duck's nest some time after she had begun to sit.—G. H. CATON HAIGH (Aber-iâ, Penrhyn-Dendraeth, Merioneth).

[What is the precise period of incubation in each case? We are under the impression that it is about twenty-eight days in the Duck, and about twenty-one days in the Pheasant. It would be interesting to have a list of species showing the period of incubation, when it varies to any remarkable extent.—ED.]

Habits of the Coot.—Apropos of the note on this subject (p. 247), I may remark that on the evening of May 30th a Coot, which had her bulky nest in an exposed position in a thin tuft of bullrushes some twenty yards from the bank of the Reservoir, was cruising about in the vicinity of her home, when a Wild Duck swam up into what I suppose the Coot considered her private water, for she resented the intrusion, and, with lowered head and erected feathers, bore down upon the trespasser. The latter retreated, but, not contented with this, *Fulica*, putting on all sail, gave chase, and,

gaining steadily, pressed the duck so hardly that she was forced to rise on the wing to escape. Later, about 8 p.m., I observed the Coot sitting placidly on her raft, and, although I appeared in the open on the bank, she would not abandon her eggs to the evening mists then rising.—OLIVER V. APLIN (Great Bourton, Oxon).

Swallows dying of Cold.—On May 15th, at the edge of a field of young corn on one side of Clattercutt Reservoir, I picked up the fresh remains of two Swallows (partly eaten by some animal or bird), and one House Martin. I happened to see them as I walked along, and made no search for others, although possibly there were many more out of sight. Like the birds mentioned by Mr. Nelson (p. 250), the Martin was in good condition, and had evidently been dead only a few hours; indeed, it was so fresh that I made a skin of it. Rain fell heavily on the 11th, 12th, 13th, and 14th, and we had large floods in the valley, the weather being very cold; wind N.N.E. The 15th was stormy, with cold N.W. wind and hail-storms. Besides hundreds of Swallows and House Martins, numbers of Sand Martins hawked over the water, far from any nesting-haunt, where in an ordinary season they should have been at this time of year, a most unusual circumstance.—OLIVER V. APLIN (Great Bourton, Oxon).

Ornithological Notes from South Cumberland.—Although the vegetation has been backward in the district, most of the migrants arrived about the usual dates. Swallows and House Martins I first noticed on April 24th, and Corncrakes on the 25th. The Cuckoo arrived on 27th: this is about the date on which the bird is invariably heard here. The Willow Warbler I did not observe till early in May, and the Creeper about the same time. On April 29th many Sandpipers were seen along the Duddon Estuary; these on the following days were dispersing up neighbouring becks. Most of the early-laying birds have nested late this spring. On April 24th I found a Missel Thrush's nest containing two fresh eggs, and on the 25th a Blackbird's; in the following week I saw other Blackbirds' and Song Thrushes' nests containing newly-laid eggs. On May 5th a Ray's Wagtail's eggs were found, and on 6th a friend discovered, on the Fells, a Curlew's nest and a Snipe's, both having fresh eggs. On 6th I saw the first Stone- and Whinchats, and one Wheatear. Up to the date of leaving the neighbourhood (May 12th) I neither saw nor heard the Nightjar, although they frequent the district in small numbers. On the Duddon Sands were many Sheldrakes: these birds breed in the estuary; they were much tamer than during the winter months, and allowed us to approach within gun-shot, although we were accompanied by a noisy colley. On May 7th we found, by watching the parent birds, some young Peewits, a day or so old; they were most amusing, running quickly for some distance, and then squeezing themselves into the foot-prints that the cows had made

in the soft ground on the brink of the runner. When thus hidden they remained motionless, and were most hard to discern. Now and then they uttered a squeak, but the cry was so ventriloquial that frequently we thought we had stepped on one, when it was in reality some little distance away. The old birds meanwhile hovered over us, and apparently directed the movements of the young ones by their cries. The young were most beautifully marked, displaying a tiny crest, and having a conspicuous white ring round the neck. Corn Crakes have been for some years on the decrease, but this season they arrived in unusually large numbers. During the winter many Kingfishers haunted the runners leading to the estuary. An unwonted number of Long-eared Owls fell victims to local guns. A Ring Ouzel was shown me that had been trapped in the lowlands; although they breed on the Fells, they are so scarce in the cultivated parts that the local birdstuffer was unable to name the specimen. There is a great scarcity of Wrens, probably owing to the excessive cold of the winter. Greenfinches, on the other hand, are extremely numerous. In the early spring several pairs of Woodcock bred in the neighbourhood. A keeper a short time ago observed a bird with young. She was conveying them across a stream, and carried them one by one, tucking up her legs so as to hold the little one securely against her breast.—T. N. POSTLETHWAITE (Hallthwaites, Millom).

Ornithological Notes from Oxfordshire.—Several young Black-headed Gulls came up the Cherwell Valley about the middle of July; in addition to the one shot on the 11th (Zool. 1885, p. 349), two were seen at Franklin's Knob on the 28th, one of which was shot, and brought to my brother. Two more were shot in the first week in August at Upton and near King's Sutton. On August 1st I saw one Common and three Green Sandpipers at the Reservoir. Wild Ducks had a good breeding season there; I counted a hundred birds on the open water on the 9th; Teal again bred there, as they did last year. On the 14th a Green Sandpiper, a young bird in moult, was shot on the Cherwell, and brought to my brother. A young Long-eared Owl, which I examined at the birdstuffer's, was shot in Worton Wood on the 15th; it still retained a good deal of down on the back of the head and nape, and was undoubtedly bred there; as a breeding species it is rare in North Oxon. The bulk of the Swifts left on or about the 17th, but I saw two stragglers as late as Sept. 5th at Bloxham Grove. Mr. Darbey, of Oxford, wrote me word that a Manx Shearwater was captured at Stratton Audley about the end of August or beginning of September. About that time also he received two Common Terns, which had been shot on Port Meadow. Although occurring much earlier in the year, I may here mention that a pair of Ringed Plovers were observed on the banks of the Thames, near Standlake, on May 5th; the male was shot and taken to my informant, Mr. W. H. Warner. A considerable number

of Quails visited us this year (1885). On Sept. 2nd we flushed two from standing barley at Bloxham Grove, which in the falling rain were let off in mistake for "squeakers," but on the 5th one of them got up again in the same field, and was shot; it was a male, probably of the year before, as, while possessing the semicircular dark lines on the sides of the face, it wanted the black patch on the throat. On the 4th, Robert Walton, who was formerly a keeper in Ireland and Nottinghamshire, and knew the bird well, told me that two rose at his feet that morning from some cut barley at Adderbury, and he put up six of them the next day; these strayed into standing oats in an adjacent field, and were then flushed, and one at least killed a day or two afterwards. On the 11th I bought two young birds, which had been killed the day before at Sibford Gower, and two more, a young bird and an old one, were hanging in the game-dealer's shop on the 14th; these were shot in the neighbourhood of Hook Norton, where five more were procured later in the season. About Chipping Norton Quails seem to have been very numerous (*vide* 'Ibis,' 1886, p. 101). In the south of the county, Mr. Darbey informs me (*in lit.* Sept. 21st.), that he and a friend shot two at Cowley on the 2nd; he had also received one from Burford, and had heard of others in the neighbourhood. Mr. W. H. Warner wrote me word (Oct. 28th) that a friend of his met with a "bevy" of seven in "Edward's Field," Standlake, and shot three or four of them in September. In that part of the county the Quail appears to be a tolerably regular visitor, Mr. Warner hearing its note every year at Standlake; but here in the north, and probably in most parts of the county, it is extremely irregular in its appearance, and in the numbers which arrive. I hear that it is fifteen years at least since we had any number, and about that date a birdstuffer preserved four examples. On Sept. 9th a Black Tern, a young bird of the year, was shot on the canal some miles above Banbury. On the 11th a young Hobby was procured in Wickham Park; it was one of three birds said to have frequented the place for some weeks, so probably a brood was reared there. A female Nightjar, not at all a common bird here, was shot at Sibford on the 14th. Mr. Darbey tells me that on the 17th he received from Headington a nearly white Yellowhammer, and he had also in his shop a Berkshire example of the Greenfinch, "just the colour of a pale canary." On the 27th, among a party of nineteen black and white Wagtails, I detected two adults of *Motacilla alba*. The party included also old male Pied Wagtails, still carrying black backs; females of the same; partly moulted young (of *M. Yarrellii*), exhibiting a narrow line of black on the sides of the breast round the bend of the wing; and unmoulted grey birds. A young Barn Owl with down still adhering was brought to the stuffers on the 28th. On the 29th there were very large flocks of Peewits in the Cherwell Meadows; one lot extending in a long double line must have numbered from twelve to fifteen hundred birds. On Oct. 10th I saw

an immature Shoveller on Clattercutt Reservoir. A Spotted Crake was shot on the Cherwell on the 19th, a rather late date for its occurrence here. The Pochard had arrived at the Reservoir by Nov. 7th, and I observed what appeared to be a female Garganey accompanying nine Teal, than which it was slightly larger, colder and greyer in colour, and with more contrasted tints. One of two Jack Snipes picked up together under the telegraph wires on the 18th weighed full three ounces. On the 21st the Tufted Duck had returned. Two large hawks, probably Buzzards, passed over on Dec. 5th, flying rather high, and proceeding in a succession of circles. On the 25th I counted over fifty Pochards and four Tufted Ducks on the Reservoir, and a flock of fifty or sixty Golden Plovers appearing in the valley a few days later, foretold the severe weather we were to experience at the beginning of the new year.—OLIVER V. APLIN (Great Bourton, Oxon).

SCIENTIFIC SOCIETIES.

ZOOLOGICAL SOCIETY OF LONDON.

June 1.—Dr. A. GÜNTHER, F.R.S., Vice-President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of May, 1886, and called attention to an Orange-thighed Falcon (*Falco fusco-cærulescens*), presented by Capt. W. M. F. Castle, R.N., stated to have been obtained in Chili; and to five Senegal Parrots (*Pœcephalus senegalus*), presented by R. B. Sheridan, Esq., four of which had been bred in this country.

Dr. A. Günther exhibited and made remarks on a specimen of a small fish of the genus *Fierasfer* embedded in a pearl-oyster.

The Secretary made some remarks on the most interesting objects he had observed during a recent visit to the Zoological Gardens of Rotterdam, Amsterdam, Cologne, Antwerp, and Ghent.

A letter was read from Mr. J. M. Cornely, of Tours, stating that his pair of Michie's Deer had bred in his park, and that a young one had been born on May 15th.

Mr. Beddard read notes on the convoluted trachea of a Curassow (*Nothocrax urumutum*), and on the form of the syrinx in certain Storks.

Mr. W. F. Kirby read a paper containing an account of a small collection of Dragonflies which had been formed by Major J. W. Yerbury at Murree and Campbellpore, N.W. India. The collection contained examples of about twenty species.—P. L. SCLATER, *Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON.

June 2, 1886.—R. M'LACHLAN, Esq., F.R.S., President, in the chair.

The following gentlemen were elected Fellows of the Society, viz.:—Messrs. C. Baron-Clarke, M.A., F.R.S., H. Wallis-Kew, W. Dannatt, J. P. Mutch, B. W. Neave, A. C. F. Morgan, and Wm. Warren.

The President announced that Mr. F. E. Robinson, a Fellow of the Society, and formerly a pupil of Prof. Westwood, had been killed by a tiger in India on April 27th last.

Mr. Stevens exhibited a specimen of *Heydenia auromaculata* (Frey.), from the Shetlands, a species new to Britain.

Dr. Sharp exhibited a number of specimens of *Staphylinidæ*, prepared by him some years ago with a view to their special protection and permanent preservation. The insects were placed in cells of cardboard, and these were covered above, or above and below, with cardboard, the whole being hermetically sealed by applications of successive layers of bleached shellac. The President said the plan appeared to be very successful where the cardboard cells were left open on both sides, but when the cell was complete below only one surface of the insect could be examined.

Mr. Billups exhibited *Meteorus luridus* (Ruthe), a species of Ichneumonidæ new to Britain, obtained by Mr. Bignell.

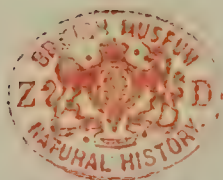
Mr. W. White, in exhibiting cocoons of *Cerura vinula*, called attention to the vexed question as to how the perfect insect escapes from these solid structures. He was inclined to think that formic acid, secreted by the insect, was a probable factor in the operation. The question as to the mode of escape from these cocoons of the parasitic Ichneumonidæ and Diptera was also raised; and the President, Baron Osten-Sacken, Mr. Waterhouse, and Prof. Meldola made remarks on the subject.

Mr. Elisha exhibited living larvæ of *Geometra smaragdaria* from the Essex marshes. He also exhibited the singular pupæ of *A. Bennetti*.

Mr. Howard Vaughan exhibited a series of several hundred bred specimens of *Peronea hastiana*, showing the innumerable varieties of the species. He also exhibited, on behalf of Mr. Sidney Webb, of Dover, an interesting series of *Cidaria suffumata*, with especial regard to the progeny of particular females, the parent and the produce of the eggs laid by her being carefully separated. Mr. Vaughan also read notes on the subject communicated by Mr. Webb; and Mr. Jenner Weir, Mr. Waterhouse, Mr. Distant, Dr. Sharp, and Mr. Stainton took part in the discussion that ensued.

Mr. A. G. Butler communicated a paper on "New Genera and Species of Lepidoptera-Heterocera from the Australian Region," in which 21 new genera and 103 new species were described.

Mr. J. S. Baly communicated a paper on "Uncharacterized Species of *Diabrotica*."—HERBERT GOSS, *Secretary*.



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SOME OF THE WAYS IN WHICH ANIMALS BREATHE.*

BY PROFESSOR F. JEFFREY BELL, M.A.

IF we consider the essential points, as distinguished from the special or accessory methods, of human respiration, we shall most easily get at the central and important facts. Minute by minute we take into our lungs a certain quantity of what we call air, and as often we get rid of what we call air too. But between what we *inspire* or take in, and what we *expire* or give out, there are certain differences; differences which, not detectable on a breezy common, soon become unpleasantly obvious in an ill-ventilated or overcrowded room. In other words, we get rid of something which we had best not take in again; that something you know is the gas which is called carbonic acid; and, though carbonic acid is quite in its place, and indeed very pleasant, in seltzer-water or champagne, it is not to be recommended as a "respiratory medium"; a little too much of it produces headache and malaise, still more of it (as in suicides by charcoal poisoning) produces death.

Air, as you know, is chiefly composed of oxygen and nitrogen, and, speaking generally, there are 21 parts of the former to 79 of the latter gas in every 100 parts of atmospheric air; if you breathe pure oxygen you become exhilarated, and if you take it

* An abstract of one of the "Davis Lectures," delivered at the Zoological Society's Gardens, July 1st, 1886.

too long your respiratory movements will cease. If, on the other hand, you diminish the supply of oxygen, you will become "asphyxiated." What you want, then, is oxygen, but you want this diluted.

The first point, then, to which you must hold is this; you cannot continue to live without fresh supplies of oxygen. What is true of you is true of every living thing, whether animal or plant, that is made up of protoplasm. Supposing these supplies to be present, how are they used? They are used up, we know, because after a time the air of a space, into which fresh oxygen cannot enter, becomes unfit for respiratory purposes. They are, so far as we can judge from the condition of the air, used up in making carbonic acid; in other words, inspired air contains more oxygen and less carbonic acid than does expired air. The proportions per hundred parts being—

	Oxygen.	Nitrogen.	Carbonic Acid.
In inspired air	20·81	79·15	·04
In expired air.....	16·033	79·557	4·380

So that about 4 per cent. of oxygen is lost from the air in the process of breathing.

But now arises this question: If every living thing requires oxygen, your great toe no less than your brain requires at times a fresh supply—how does it get it? It gets it from that medium which is the source of communication between the various parts of the body—it gets it from the blood. If you were to take some blood which had just been pumped out of the heart into the great blood-vessels, and compare it with an equal quantity of blood just returned from the body to the heart, you would see that the former would be bright scarlet, the latter of a purplish hue; and if, with a suitable air-pump, you removed the gases from the blood, you would find that the amount of oxygen in the purple blood was only one-half of that in the scarlet fluid, and that the carbonic acid had increased by about eight parts in a hundred; and further, were you to shake up the purple blood with air or with oxygen you would find it become again of a bright scarlet colour.

The second point, then, is this: on its way round the body the blood loses its oxygen and gains carbonic acid. Though we call this blood a fluid, yet it is, we know, "thicker than water";

it is thicker because it is not merely watery,—it has suspended in it a number of little bodies which are called “corpuscles.” Of these corpuscles some are white, and some are what we call red, though in a shallow layer they are rather yellowish in colour; but in mass they are red. The redness of the blood is, of course, due to the redness of the red corpuscles; the redder they are the redder the blood.

Note here, then, that the process of respiration appears to have as an accessory phenomenon a change in colour; and observe that this colour is dependent for its change on the addition or removal of oxygen. The colouring matter of the red blood corpuscles, which may exist in two stages of oxidation, one a higher and the other a lower, is surely enough the body to which we must direct our attention if we want to find out the secrets of our respiratory processes. The matter itself is known as *hæmoglobin*, and chemical investigation has shown that more than 90 per cent. of dried red blood corpuscles consists of *hæmoglobin*. This *hæmoglobin* may be separated from the blood corpuscles, and, after suitable treatment, appears in the form of crystals; the crystals are soluble in water, and it is possible therefore to have a solution of *hæmoglobin*.

In 1862, Prof. Stokes, now President of the Royal Society, applied to blood that instrument which has done so much in revealing to us the composition of complex bodies; you know, of course, that if we examine solar light by means of the spectroscope we find the various bands of colour, red at one end and purple at the other, marked by dark bars; and that these dark bars, which have been accurately mapped out, reveal the presence of certain elements in the light; the so-called D lines are, for example, the only two that are seen when pure sodium is being burnt before a spectroscope. The investigation of colouring matters by Sir David Brewster, Sir John Herschel, and other philosophers showed that some of these matters when examined by the spectroscope present dark bands or bands of absorption of light; these are the so-called absorption-bands. Now, Prof. Stokes found that arterial and venous blood gave different absorption-bands, and that by adding reagents which reduced the blood or took up its oxygen he could convert the two bands of any *hæmoglobin* into the single intermediate band of reduced or venous *hæmoglobin*.

This power of carrying oxygen may be made clearer to you if I remind you that the same property is possessed by nitric oxide, and is made use of in the manufacture of sulphuric acid, Sulphurous acid (SO^2) acting on nitrous acid in the presence of steam forms sulphuric acid and nitric oxide. The nitric oxide, if put in contact with moist air, takes up oxygen from it, and forms again nitrous acid.* In this way a small quantity of nitric oxide helps to make a large quantity of sulphuric acid.

If I put this shortly, I shall put it in the way I particularly wish you to remember to-day. Hæmoglobin exists in two states of oxidation. If this be true of hæmoglobin it is, no doubt, true of other colouring matters, which with similar tests give different absorption-bands; and, if this be true, then is the converse true also. Colouring matters which exist in two different states of oxidation are respiratory agents. Before, however, we pass to the consideration of other colouring matters, let us first review our knowledge of hæmoglobin.

Aristotle's division of animals into those with and those without blood has long since ceased to recommend itself to naturalists, but until 1872 they were altogether ignorant of the distribution of hæmoglobin outside the division which is called that of Vertebrates, and to which alone Aristotle assigned the possession of blood. In that year Prof. Ray Lankester gave an account of his researches, which had extended over more than four years, on the distribution of hæmoglobin in Invertebrates; additions of various forms have since been made, but only one important addition, that of a representative of a different sub-kingdom. Lankester found the colouring matter in various marine and fresh-water worms, in molluscs, and one larval insect; in 1880 M. Foettinger reported its presence among the Echinodermata, for he found it in the water-vascular system of the Ophiurid, *Ophiactis virens*; lately Mr. W. H. Howell has found it in red discs in the water-vascular system and the body-cavity of a Holothurian. In all but a few of these cases (*Solen*, *Arca*, *Glycera*, *Capitella*, *Phoronis*, *Thalassema*, *Hammingia*) the hæmoglobin is not contained in special corpuscles as it is in ourselves and other Vertebrates, but it is dissolved in the fluid blood-plasma.†

* $\text{SO}^2 + \text{N}^2\text{O}^3 + \text{H}^2\text{O} = \text{H}^2\text{SO}^4 + 2\text{NO}$. $2\text{NO} + \text{O} = \text{N}^2\text{O}^3$.

† The student interested in the subject will find a list of the animals in which hæmoglobin has been found in Dr. W. D. Halliburton's interesting

This useful oxygen-carrying colouring matter is not, however, confined to the blood; like some others which we shall have to notice soon, it is to be found in some of the tissues; it was detected by Lankester in the muscles of the vertebrate heart, in the voluntary muscles of mammals, in the muscles which move the "tongue" (odontophor) of Gastropod Molluses, and in the central nervous system of the Sea Mouse (*Aphrodite aculeata*).

An account of its distribution in the nervous tissue of some of the Nemertine Worms has been given by Prof. Hubrecht, and its relations to the respiratory processes are here so obvious and so instructive that we shall do well to consider the question in detail. When I had the honour of addressing you last year I directed your attention to certain peculiarities in the structure of the Nemertine Worms, which exhibited a wonderful resemblance to what was seen in the Vertebrates; I told you then of the sacs or grooves which lay on either side of the head, and had the function of respiratory passages; these passages appear to be specially useful in carrying oxygen to the central brain-mass, or, in other words, they appear to act as parts of a cerebral respiratory apparatus. Now, in the division of the Schizonemertini, in which there is a deep lateral fissure on either side of the head, the nervous tissue is impregnated with hæmoglobin, but the blood is free of it; in the Hoplonemertini, on the other hand, the blood becomes the chief oxygen-carrier, as is shown by its impregnation with hæmoglobin; the lateral fissures close up, and hæmoglobin disappears from the nerve-tissue. The Schizonemertine arrangement appears therefore to be a temporary expedient for attracting oxygen to the parts which need it most; with this structural arrangement it is instructive to correlate the mud-dwelling habits of the worms that possess it.

Let us turn now to other colouring matters than hæmoglobin. Within the last few years, and especially owing to the researches of Dr. MacMunn, who has demonstrated that the active practising physician can aid considerably in the advancement of natural knowledge, our acquaintance with colouring matters other than hæmoglobin has been very greatly increased.

memoir on the blood of Crustacea (Journ. Physiol. vi. pp. 332—3). The statement in the text as to the presence of hæmoglobin in special corpuscles is more correct.

The first colouring matter which attracted much attention was that which is so widely distributed among plants—leaf-green or chlorophyll, as it is ordinarily called. You know that if a plant be kept in the dark its leaves lose their green colour, and you know also that when sunlight shines on green leaves under water little bubbles of gas continually rise to the surface; this gas is oxygen, and it is known that chlorophyll is capable of breaking up carbonic acid in sunlight, storing the carbon and setting free the oxygen.

In a few animals, the fresh-water sponge, the green *Hydra*, some Planarian worms, the protoplasm may be seen to contain chlorophyll-corpuscles; and in the last of these Mr. Geddes has, by direct experiment, shown that in sunlight oxygen is given off, so that in them, as in green plants, the colouring matter is a producer of oxygen. The advantage of this to the animal is obvious; not only can it take in such oxygen as is dissolved in the water, but it can manufacture oxygen around of and for itself. That such an arrangement is desirable is, curiously enough, shown by another set of facts; in some of the Protozoa, the Radiolarians, and in the Sea Anemones naturalists have very frequently detected the presence of what they called "yellow cells." These were at first regarded as parts of the animal; but when it was found that they did not die when their host died, and that they could migrate from one individual to another, it was concluded that they were parasites; and parasites, in a sense, they are. But, unlike such parasites as the tape-worm or the fluke, they give as well as take; their yellow colouring matter is capable of breaking up carbonic acid, and while these Algæ—for such they are—store up for themselves the carbon, they set free the oxygen of which the host takes its share. This beneficial mode of clubbing together is now known as "Symbiosis."

In some of the marine Annelids (*Sabella*, *Siphonostomum*, *Chloronema edwardsii*) the blood is of a green colour; this colouring matter has been called by Lankester "chlorocruorin," and it presents in its oxidised condition an absorption-band between the lines C and D, and another, fainter, between D and E; on reduction of the oxygen the spectrum has a single band which lies between C and D, but is somewhat fainter than the almost similarly-placed band of oxy-chlorocruorin. Just as

with hæmoglobin, the reduced solution has only to be shaken up with air for the two bands characteristic of oxy-chlorocruorin to reappear.

The fact that the blood of some snails is blue has been known for nearly fifty years, and since 1817 various corroborating observations have been reported; it remained, however, for a Belgian observer, M. Frédéricq, to put our knowledge on a firm foundation. In 1878 he described the phenomena presented by the blood of the Octopus; he found it to be blue on exposure to air, but to lose its colour when boiled in the receiver of an air-pump, or when reduced by the passage through it of a current of carbonic acid or of sulphuretted hydrogen; so far it resembles hæmoglobin, to which also it is similar in being composed of a proteid body, and of another which contains a mineral; this mineral, however, is copper, and not, as with hæmoglobin, iron. Frédéricq reported that oxy-hæmocyanin has no absorption-bands, but Dr. Halliburton finds that with an oxidised solution the ends of the spectrum are cut off, while there is no such diminution of light with a reduced solution.

Hæmocyanin is not confined to *Octopus*; it has been found by Krukenberg in the blood of the *Sepia* and the Squid, of the ear-shell (*Haliotis*), *Murex* (the purple snail of the Romans), and other Gastropods; by the same physiologist in the Crayfish and the Crab, and other Crustacea; and by Frédéricq in the Lobster. Professor Ray Lankester, as he doubtless told in an earlier lecture of this course, found it both in *Limulus* and in the Scorpion.

With regard, then, to the mode of respiration which is comparable to our own storing up of oxygen in the red blood corpuscles, and giving it to the oxygen-carrier hæmoglobin to distribute through the body, we find that all normal Vertebrates (here, of course, the Lancelet is not included) do the same; so do two molluscs, five worms, and one holothurian. A number of worms, some molluscs, some Echinoderms, and two Crustacea are known to have hæmoglobin dissolved in their blood; others have instead a green or a blue colouring matter, which in all the essential particulars of a respiratory colouring matter resemble hæmoglobin. Four Crustacea have tetronerythrin in their blood, and some Lepidoptera have chlorophyll. Here we have colouring matters in the blood. Incidentally I have told you

already that hæmoglobin is found in certain tissues, in the muscles of mammals and others, and in the nerve-tissue of *Aphrodite* and the Nemertines. We come now to the consideration of other colouring matters which are deposited in the living tissues other than or as well as the blood.

From the curious green-coloured Gephyrean worm, which is known as *Bonellia viridis*, and which, when adult, lives in hollow cavities in rocks where it cannot be bathed by water, a green colouring matter can be extracted; this colouring matter is called Bonellein, and it is found to be deposited in clusters of green granules in the skin of the animal's body; on adding a little acid to this green matter it becomes purple.

If you place a Rosy-feather Star (*Antedon rosacea*), or such a common Sea-urchin as *Strongylocentrotus lividus* in fresh water you will find that the water soon becomes of a reddish-brown colour; if you want a larger and better supply you had better put the echinoderm into alcohol, which dissolves out the colouring matter more completely and rapidly. This colouring matter, which has been closely studied by Dr. MacMunn, has been called by him Echinochrome; to his admirable papers I must refer you for details. Here only can it be said that he finds it capable of existing in two stages of oxidation, one higher and one lower; resembling hæmoglobin in this, it doubtless also resembles it in its function of being a respiratory agent.

The very beautiful colouring matter of the stalked Crinoids, to which Prof. Moseley has given the name of Pentacrinin, has not only different absorption-bands, according as its solution is acid or alkaline, but an acid solution is red and an alkaline one green.

In a large number of invertebrate animals, Dr. MacMunn has discovered a body which is allied to chlorophyll; as it is deposited in the glands connected with the intestine (enteron) he has called it Entero-chlorophyll. This substance appears to be formed by the animal itself in the glands which, far from correctly, are spoken of as the "liver" of the Starfish, the Crayfish, or the Oyster. On this, as on two other colouring matters which have been found by the same observer in the tissues of both Vertebrates and Invertebrates, *viz.*, myohæmatin, which is found in muscular tissue, and histohæmatin, we may hope to

have soon much further information. For us the great point is that they are all respiratory in function.

The red coloration of the body of many marine animals appear to be associated with yet another colouring matter of respiratory significance; to this Wurm, who first observed it in those red parts on the beaks of Pheasants and other birds, which ornithologists call the "rosette," gave the name of tetronerythrin; Merejkowsky has found it in 104 species of Invertebrates and fishes, and he tells us that it is often present even when the animals appear to be yellow, green, or brown in colour; it is chiefly found in the tissues that come in contact with the water, and it is important to observe that it is absent from those forms which have symbiotic algæ providing them with oxygen. Dr. Halliburton has found it in the blood of Crustacea. The function of this colouring matter is quite possibly respiratory, but, as it does not lose and take up oxygen, it cannot be compared with hæmoglobin or hæmocyanin.

We have now to consider the ways in which the oxygen in the air or in the water makes its way to the tissues, or to special organs set apart for respiratory purposes; these ways may be conveniently grouped under three heads:—

1. The simplest and the earliest arrangement is that which has been called vague. Here there are no special respiratory organs, and in the simplest cases even respiratory colouring matters are wanting. The simple *Amæba*, and the Protozoa generally, the lower worms, such as Planarians and others, afford us examples of forms in which the whole body, being bathed in water (or rarely in air), the carbonic acid of the cell or cells makes exchange for oxygen on the general surface of the body; in the Starfish, where respiratory pigments appear to be present, the thin membrane which lines the body cavity sends out a number of delicate processes between the interstices of the body-wall; these multiply the opportunities for gaseous exchange between the fluid within and the sea-water without the membrane, and so carbonic acid constantly escapes and oxygen as constantly enters.

In the earthworm, again, respiration takes place over the whole surface of the body, but the blood-vessels come very near to the surface; in the leech the general arrangements are much the same, save that the blood-vessels are still more superficial.

Here the cells of the epithelial layer underlying the structureless cuticle which they form is, as Prof. Ray Lankester has shown, penetrated by fine blood-vessels, which form an intra-epithelial system, and come as near to the surface as they possibly can. More recently M. Stolc has described an elaborate system of plexuses in the integument of an earthworm, *Ilyodrilus*, and a system of superficial capillaries has been found in the earthworms *Perichæta* and *Perionyx* by our prosector, Mr. Beddard. As our knowledge of the finer anatomy of lower forms increases we shall, I believe, be able to add considerably to the list of animals which, with a vague respiration, have their oxygenating blood-vessels brought into the closest possible relation with the external medium.

The greater number of definite respiratory organs fall under the head of outpushings or ingrowths; the former are called gills, the latter air-tubes (tracheæ) or lungs.

2. The system of respiration by gills is preceded physiologically by the method adopted by the Starfish; when carried further and made a definite arrangement, it often consists in the possession of a number of delicate tubes, hollow within, and having thin walls; within flows the respiratory blood or fluid, without is the external respiratory medium, the movement of which is often aided by the presence of those delicate protoplasmic processes which we call cilia; the constant contraction of these gives rise to the formation of currents in the water, and so allows of a renewal of the oxygen-carrying water. Delicate respiratory filaments of this kind are to be found among some of the bivalved Mollusca, such as the Sea-mussel (*Mytilus*), or the Scollop (*Pecten*); but they become converted into continuous plates in the fresh-water Mussel (*Unio*), and a large number of Mollusca. Here the motive power of the respiratory medium is to be found in the cilia which cover the gill-filaments or the plates into which they fuse. In the Crayfish, where the gills form plumes on either side of the body, the cells of which they are made up are, like all other cells in the bodies of Crustacea, quite devoid of cilia; the motive-power must consequently be looked for elsewhere. First of all we may find it in the fact that some of the gills are attached to the bases of the walking limbs, and it is clear that when these limbs move the gills will move too, and so agitate the water that bathes them; but even when

a Crayfish is at rest it requires fresh supplies of oxygenated water. To obtain this it does what Crustacea nearly always do when they need a fresh organ; it makes use of one of its appendages (the second pair of maxillæ), part of which it converts into a scoop-shaped organ which, lying at the anterior end of the box in which the gills are placed, moves backwards and forwards about 200 times a minute, and by scooping out water at that end creates a vacuum which is filled by a rush of water into the hinder end of the box.

A very interesting series of modifications are found among the Echinodermata; while the Starfish, in which the skeleton is often loosely reticulated, has no special respiratory organs, the Brittlestar, which has a closely-compacted skeleton, has a pair of clefts at the base of each of the five arms; these clefts lead into pouches or bursæ, the walls of which are thin and project into the body-cavity; into these pouches water enters and again escapes, taking in with it a fresh supply of oxygen, and bringing away with it carbonic acid. Among the regular Sea-urchins the gills are ordinarily external, and in the dry test their position may be noted by the notches or indentations around the margin of the mouth of the test. In the most ancient extant forms—the *Cidaridæ*—the gills are not external, but, as Prof. Charles Stewart has shown, there are five internal gills around the Lantern of Aristotle; here the water of respiration enters within the boundary of the test in much the same way as it does in Ophiurids.

3. Another set of breathing-organs obtains among animals that live on land, and in a comparatively small number of marine forms. Here, in place of projections outwards, there are depressions inwards, or in some other way cavities are formed into which air passes to meet perhaps with the blood which is richly distributed in the walls of the cavity. The best-known apparatus is that of lungs; as we know them in ourselves and all higher Vertebrates, such as other mammals, birds, and reptiles, these lungs are outgrowths from the anterior part of the digestive tract. It must not, however, be thought that this lung-cavity is confined to the higher Vertebrates; a sacular outgrowth from the intestinal tract is seen in a number of fishes; in some, as for example the Salmon, the air-sac, as the organ is then called, remains connected throughout life with

the tract; but in others, as the Cod, it becomes shut off from it, and forms a closed bladder. This air-bladder has in such Physoklistous Fishes merely the function of a hydrostatic organ; it diminishes the specific gravity of the fish, and aids it in supporting itself in the water. In ourselves the lungs are not often called upon to perform this hydrostatic function, but we find them useful when we try to swim, and without them we should indubitably sink to the bottom whenever we fall into water beyond our depth. In the Salmon the respiratory action of the air-bladder is no doubt unimportant; this for two reasons: it is not specially well provided with blood-vessels, and the Salmon is not in the habit of swallowing air by its mouth.

What is true of the Salmon is not, however, true of all fishes; some have the walls of their air-bladder specially well provided with blood-vessels, and some do swallow air by the mouth. The American Ganoid-fish, *Amia*, has been closely watched by Prof. Burt G. Wilder, who observed a captive specimen rise to the surface of the water in which it was swimming, open its jaws widely, and apparently gulp in a large volume of air. In such fishes as the *Ceratodus* of Australia, the *Polypterus* of West Africa, and the *Lepidosiren* of South America, which are the representatives of the group which ichthyologists call Dipnoi, or double-breathers, a special vessel is sent to the air-sac. This vessel, curiously enough, comes direct from the gills, branches in the wall of the sac, and then makes its way back to the heart to have its contents pumped through the body; such blood is, then, doubly aërated.

Interesting as these stages are, the gradations between air-sacs and lungs have not been exhausted; in the Salmon the duct of the sac opens on the upper or dorsal side of the digestive tract, in *Ceratodus* it lies to the left of the ventral surface; while in *Polypterus*, as in higher forms, it opens on the ventral middle line. In the Ganoid, *Amia*, the sac is single; in its ally, *Lepidosteus* (the Gar-pike), it is single externally, but divided internally; and in *Polypterus* it is double. Nor is the name sac, as indicating a merely hollow bag, any longer appropriate. Even in the first-mentioned Ganoids the cavity within is broken up by bands of intercrossing tissue, which support blood-vessels; the sac, in fine, becomes spongy in texture, and

is, indeed, more spongy than in some Amphibians (e. g., *Menobranthus*).

While there are fishes that breathe by lungs as well as by gills, so are there some allies of the frog, which, unlike it, retain their gills throughout life; here, again, we get an instructive series of gradations. The lowest Amphibia, or those which retain their tail throughout life (Urodela), may, like *Menobranthus* and *Proteus*, have persistent gills in addition to lungs; in *Menopoma*, *Amphiuma*, and *Megalobatrachus* the gills disappear, but one or two of the clefts through which, in larval life, the gills protruded, persist in the adult condition, though the gills themselves are lost.

It is very instructive to remark with what difficulty the gills are lost; this is especially well illustrated by the developmental history of *Epicrium glutinosum*, the Cæcilian of Ceylon. *Epicrium*, as Messrs. P. B. and C. F. Sarasin have lately told us, lays eggs within which the young are hatched. While still within the shell the young develop, on either side of the head, a tuft of three blood-red gills which move about constantly in the surrounding fluid. When these gills disappear the young escape from the egg-shell and pass into water; here the gill-clefts are at first open, just as they are in the adult *Menopoma*; later on the clefts disappear, and the Cæcilian takes to a terrestrial mode of life.

As I am confining myself to breathing-organs, I must not now trace the fate of the gill-clefts in those higher Vertebrates in which gills never serve as organs of respiration; but you who have heard Professor Parker speak from this place know, doubtless, of the important functions which remain for the clefts, and the indications of them that are to be seen even in ourselves.

Quite another form of terrestrial respiratory apparatus is found in that great group, the members of which outnumber all the rest of the Animal Kingdom; I speak, of course, of insects and their allies. Here we have to do with thin tubes instead of with wide sacs; these tubes are called tracheæ, and the mode of respiration is not pulmonary but tracheal. The simplest condition of this mode is found in that most interesting and instructive animal *Peripatus*; this instructive creature shows by its wide geographical distribution that it is an exceedingly archaic form, and we might well suppose from that one indication

alone (although, indeed, there are others in plenty) that we should find in it a very primitive condition of the respiratory apparatus. Scattered over the whole of the body there are minute orifices; these each lead into a pit which widens out at its base; from this base there are given off a number of delicate tubes which make their way into the organs of the body; it is by their means that the necessary oxygen is conveyed to the tissues and cells of the organism.

As we pass from this low and primitive form to the more highly organised Insects we find, as elsewhere in the Animal Kingdom, and as with other organs, that diffuseness and simplicity give place to concentration and complexity. The number of orifices becomes greatly reduced, so that at last there are but two or three pairs; the tubes themselves become strengthened and kept open by a chitinous fibre which extends spirally along them, and the supply of air to the whole body is effected by the branching of the trunks and their union with one another.

If I were to try to sum up what I have attempted to tell you to-day I should put the result thus:—

Respiration, or the exchange of fresh oxygen for the carbonic acid which is constantly formed as one of the waste products of the activity of all living cells, is to be observed in every living organism; like every other function, it is performed in a vague manner—or without the aid of special organs—by the lowest. In the higher there are special parts of the body allotted for this function, and these may be outgrowths or ingrowths. These organs are, in a large number of cases, aided by certain chemical compounds which have the office of oxygen-carriers; that is to say, they are capable of storing up oxygen and of giving it up again, and they are able to repeat this alternation of conditions repeatedly, and throughout life. Indeed, without them the life of the higher organisms would be impossible.

NATURAL HISTORY AND SPORT IN THE HIMALAYAS.

BY SURGEON-GENERAL L. C. STEWART, F.Z.S.

(Continued from p. 294).

Fagoo, Oct. 3rd. — As I found other visitors were expected to-night, and Capt. H.'s accommodation was limited (his hospitality being in the inverse ratio), I deemed it expedient to start my small establishment directly after breakfast for Fagoo, about four miles on, promising to give H. a day of my society on my return. There is a decent travellers' or dawk bungalow at this place. The road is good, and the scenery lovely and varied *en route*; beautiful hanging woods, oak, rhododendron, yew, juniper, chestnut, and a score of others, looking their best in the autumnal change of leaf. Occasionally at an abrupt turn of the road a stupendous precipice would present itself, a corresponding wall towering above the road, which is in fact cut out of the mountain-face. At one of these points I came upon a colony of the Spine-tailed Swift, *Acanthylis* (or *Chætura*) *gigantea*, a bird of great interest, rare, and difficult to procure, from its amazing velocity of flight; requiring some skill in shooting, and a good deal of luck in recovering when shot, owing to the difficult style of country one has generally to traverse in searching for it. Luckily for me, on this occasion several of these Swifts were flying across the face of the cliff above me, and as I only fired when they were on the turn I thus minimised the chance of missing. I blazed away, and by good luck *bagged* three out of five I *dropped*, and that out of a dozen I *fired at*. All the time I thought it was *Cypselus melba* I was firing at, for I had never before seen the Spine-tail alive. My delight may therefore be imagined on procuring three specimens with such comparative facility. Nothing ever witnessed by me in the way of bird-flight approaches this Swift's rush; the nearest thing I could think of being the swoop of a Falcon (for I never saw a Humming-bird alive). I got three more to add to my collection before the trip was over. The acquisition of these birds took me an hour and more, but I did not consider it time wasted.

Sauntering along through the lovely woods I got among other things a pair of *Garrulax variegatus*, and I saw *G. leucolophus* and *G. albogularis*, besides *Geocichla citrina*, *Oreocinclla dauma*, and

a large speckled Thrush, presumably *T. viscivorus*; of *Ruticilla frontalis* a pair; *Henicurus maculatus* of course near water: this is one of the most beautiful and conspicuous of Himalayan birds. I knocked over a bird without knowing what it was; it proved to be a young one in very mottled plumage of *Petrophila erythrogastra*, so I fancy this Thrush is a late breeder. It is pretty common on the lower ranges, but not so conspicuous a bird as *P. cinchlo-rhyncha*, which delights to "pour forth" its rather pleasing ditty from the topmost branch of a tree; and why these two birds are called "Rock Thrushes" I know not, for they are essentially sylvan in their habits. Just as I reached the Fagoo Bungalow, I got a specimen of *Zoothera monticola*, an odd-looking, ungainly bird for a Thrush, if Thrush it be; the first example of it I secured the previous winter below Kussowlie at first puzzled me; I thought the strangely long bill was an individual deformity.

Oosrao had been successful in the forest again, and brought in a brace of Kalij Pheasants and a splendid Eagle, *Spizaetus Nipalensis*, an adult male. These Eagles are, in my poor judgment, a good deal mixed up in books, but this bird answers to Jerdon's description pretty well; a series of specimens and works of reference are, however, essential for the determination of species whereof individuals are found to differ according to age, sex, and sometimes season of the year.

My friend Capt. T. rode up to the door just in time to share my dinner, and he would have had short commons had I not ordered one of the Kalij Pheasants to be spatchcocked; and we resorted to the same excellent mode of cooking them on many other occasions. As we were sitting down to dinner I saw a large Owl glide past the verandah and settle on an oak behind the bungalow; my gun was dismantled at the time, having just been washed out; on putting it together I cautiously crept out, and after much dodging knocked the bird off its perch; but unfortunately a shot had carried away a portion of its bill. I sent this specimen to Calcutta, labelling it *S. aluco*; but Blyth in acknowledging it informed me it differed from that species, and called it *S. niviculum* of Hodgson. I afterwards had an opportunity of comparing this specimen with examples of the European bird in the Asiatic Society's Museum, and confess I did not then see sufficient grounds for separating them. In after

years I got several examples at Landour, and kept one alive for many months, feeding him, when I had the chance, on *Mus niviventer*, the common house Rat of the hills. In an adjoining cage I had a specimen of the beautiful *S. newarensis*, which had been sent to me from the interior by my friend Mr. Frederick Wilson ("Mountaineer"), and I had many a visitor to see these pets. I got two kinds of Horned Owl in these mountains, viz., *Bubo Bengalensis*, which is rare off the plains, and *Ketupa flavipes*, the Yellow-legged Fish-Owl, also a rare species; its congener, *K. Ceylonensis*, pervades India, Ceylon, and Burmah, but I have not met with it on the hills.

Fagoo, Oct. 4th.—I had a very successful day, and might have obtained many more specimens, but, as it was, got more than enough for the stuffer to prepare properly. Starting at daylight, I strolled about for three hours in the beautiful "hanging" woods; many of the shrubs and trees were assuming their autumnal tints. Wild fruits and berries were in abundance; raspberry, barberry, and others affording ample food to hosts of birds of many kinds. I first secured a pair of Bullfinches, *Pyrrhula erythrocephala*, a pretty species which I had found at Kussowlie the previous spring, and I got three or four more before leaving Fagoo.

A second species, *P. aurantiaca*, has been described from Cashmere, and two or three others from Nipal and Sikim, at great elevations. In dense brushwood I noticed a pair of small brown birds hopping about, turning up the dry leaves and keeping up a faint whistling conversation. I did not at first recognise them, but on securing a specimen found it was the Red-eyed Wren Warbler, *Stachyris pyrrhops*. It is not a very common bird, but pervades the whole of the N.W. Himalayas. I afterwards found it to be very common at Koteghur, and I there observed it to be more arboreal in its habits than on this occasion, frequenting the mulberry-groves, &c. I once got its nest in the soldiers' garden at Kussowlie, in the end of May, in a thicket of dwarf bamboo; a shallow cup made up chiefly of fine grass-stalks, with a few leaves, on which lay the four eggs of a light greenish grey, with faint dark spots and speckles.

The Kalij Pheasant, *P. albocristatus*, is by far the most common kind in this part of the hills, and is found in winter at the foot of the first range. I shot a brace to-day; and they

figured on our table almost daily during this expedition. They are constantly brought in for sale by the native poachers, and may be bought for three or four annas each (fourpence to sixpence); and I have found them most plentiful in low jungle, but not in the depth of the forest. They are usually met with in pairs, but I once put up a covey of more than a dozen. I esteem them the best of the hill Pheasants for the table. Following the course of a mountain-stream, I obtained fine specimens of several species restricted to such localities, the most conspicuous of these being of course the *Henicurus*, and the two Water Redstarts already noticed. Another irrepressible bird always to be met with about the mountain-torrents is *Myiophonus Temminckii*, the Himalayan Blue Whistling Thrush; in this species the bill is yellow, thus distinguishing it *inter alia* from its representative of Southern and Western India, whose bill is black. Of other Thrushes observed to-day I may mention *Oreocincla mollissima*, *Merula Wardii*, and *M. bulbul*, of which I got good examples; all of these were observed solitary. Of *M. castanea* I saw a party of eight or ten, and bagged a pair at a shot. I believe it is not decided among ornithologists if this bird be a distinct species from *M. albocincta*. The only Bulbul I noticed in this part of the country is *Pycnonotus leucogenys*, the white-cheeked, crested one, and it is very common; it leaves for the plains about this season, revisiting the hills to breed about April. A species of black Bulbul with red vent, *P. pygmaeus*, visits the hills also in summer, and occurs at Kussowlie and Simla; but I have not seen it farther within the mountains, nor did I see the red-whiskered species, *P. jocosus*, at all.

I noticed a pair of dusky Mynahs, *Acridotheres fuscus*, this morning, and subsequently a few at Koteghur; but they are not nearly so common in these parts as about Mussoorie and Almorah, where they supplant the almost ubiquitous *A. tristis*. I saw no other kind of Mynah during the trip. Of Laughing Thrushes I this day noticed four species: *G. albigularis*, very common and self-asserting, in large families; *G. variegatus*; *G. erythrocephalus*, less so, and in smaller assemblages; and *G. lineatus*, always in pairs. Found a beautiful pendent nest, undoubtedly that of some species of *Nectarinia*, possibly *N. Gouldii*, or it may be *N. miles*, if that lovely species occurs so high. It was of the usual pyriform shape, constructed of thickly-felted materials,

leaves, hair-like grass, &c., lined with thistle-down, and plastered outside with cobweb; and with scraps of tiny lichen, bits of decayed bark and wood, and two or three feathers here and there stuck on to set off the building; the entrance, an oval hole, was about half-way down; and there had been a shelf or portico over it, but the rain had somewhat disintegrated this portion of the beautiful little fabric.

I shot a fine Wood Pigeon, *C. Hodgsonii*, on my way home, and observed several of them, but very shy. Capt. T. had gone out on a different beat, but had brought in nothing particularly noteworthy; his best spoils being a *Zoothera monticola* and a Yellow-naped Woodpecker, *G. flavinucha*, a female, which has the front of the neck pale chestnut in place of yellow, as in the male. A Ghoral, which started within a few yards of him, got away safe, as he was loading at the time, and he saw no other game of any sort. A paharee brought in for sale this evening sundry skins of Pheasants, but they were useless as specimens, from want of adequate "antiseptic treatment," having only been rubbed over with solution of alum; but he had a good flat skin of the Pine Marten, *M. flavigula*, and a couple of the pretty Himalayan Weasel, *Mustela subhemachalana*, which I gladly purchased. The Weasel was new to my collection then, but I afterwards got several in the neighbourhood of Mussoorie. This man told me he had seen a pack of Wild Dogs the day before, and engaged to shoot one for me; but I saw no more of him nor of the dogs.

Fagoo, Oct. 5th. — We had a beat for game in the woods to-day, but our success was not brilliant, only five Kalij Pheasants after as many hours good hard toil. Capt. T. remained several hours longer, *solus*, and got another brace, and a Woodcock, a veritable *Scolopax rusticola*, an early arrival, and therefore unlooked for in the beginning of October. These woods seem designed for them, but I never saw a second from this part of the hills. North of Mussoorie they are not so rare, and from that locality I have also seen specimens of the Himalayan Solitary Snipe, *G. solitaria*, as I have of the Wood Snipe, *G. nemoricola*, from the country at the foot of the hills; but they are by no means common birds, any of them, and it is considered rather an event to bag one.

I got a single specimen of the curious little Piculet (as Jerdon calls it), *Picumnus innomatus*, in the afternoon. As its name

implies, it is a dwarf Woodpecker, but much less arboreal in its habits than that family generally is, affecting brushwood and coppice, creeping about the low branches, and seeking its insect-food among the fallen twigs and leaves. It is not usually found at so high an elevation, but its small size and unobtrusive habits may lead to its being overlooked. One of the best birds I procured during the whole trip was, to-day, a single specimen of a minute Tit-like bird, *Ægithalus flammiceps*, which I had only seen once before, below Simla. There were several of them mixed up with a large family party of other small insectivores in a rhododendron, but they all dispersed before I could load again. They are in general not so easily put to flight. I met with it a few marches on, at the margin of the pine-forest, several times. As I had had enough of fagging for the day, and there were a good many specimens to prepare, I sent Oosrao out in the afternoon with my gun to explore the woods. He brought in after dusk a beautiful Wood Owl, *Syrnium Newarensense*, obtained in a deep ravine close to the bungalow, and had seen another. This specimen measured $20\frac{1}{2}$ in., and its alar expanse 52 in., and was in perfect plumage; irides dark brown; and the stomach contained a large bolus of feathers and finely-comminuted bones of a *Hypsipetes*, as far as I could make out. Oosrao also produced a Flying Squirrel, *P. inornatus*, and said he had killed its companion; but could not find it, owing to the density of the underwood. The only other trophy he brought in was a specimen of *Zoothera monticola*.

Fagoo, Oct. 6th.—Spent the whole of this day in the woods, and did not deem it necessary to go a mile beyond the bungalow. I got nothing new to my collection, but added some rather good things to it. Among these sundries were three fine Grosbeaks, *Coccothraustes icterioides*, and I noticed a dozen of them; *Megalaima virens*; *Pomatorhinus leucogaster*, the first seen of this species, and it was solitary; *Sibia capistrata*, common in the woods; *Siphia strophciata*; *Myiagra cærulea*; *Picus Macei*; and *Caprimulgus monticolus*. I might have got scores of specimens of sorts, but refrained from firing at anything I did not really particularly want. Capt. T. went off by himself in quest of game, and bagged a Cheere Pheasant and a Kalij, and a couple of Wood Pigeons, *C. Hodgsonii*. As he seemed rather anxious to push on, we resolved to make for the next bungalow in the morning.

Theog, Oct. 7th. — Elevation 7400 ft.; distance from Fagoo five miles and a half; a good road, and lovely scenery. Started after an early breakfast, and reached this place late in the afternoon, stopping here and there at likely places for ornithological gains. It was a delightful ramble, the weather perfect, and the scenery beautiful, beyond my poor powers of description. A good little staging bungalow here, though somewhat out of repair; the rains had been heavy, and the ceilings and walls bore signs of dilapidation therefrom. In course of the day I saw at least a dozen Lammergeyers, *Gypæetus*; they are easily distinguishable a long way off, which most of them were, by the peculiar wedge-shaped tail. The Great Himalayan Vulture, *Gyps fulvescens*, sails along in much the same majestic style, but is easily recognised by its square tail and the upturning of the tips of the wing-feathers. Somebody (I think Hutton) separates the Himalayan from the European Bearded Vulture. I have not seen the latter *wild*, but the captive examples in the Zoological Gardens, though adult, have not a trace of the ferruginous colour which pervades the whole under parts of the Himalayan bird when mature; and I think that, although two blacks do not make a white, distinct species have certainly been manufactured with less reason. The Briton in India always calls this bird the "Golden Eagle"; the native name for it here and at Mussoorie is *Eel*, which signifies Eagle. All Vultures are called *Geed*.

I got nothing new nor particularly interesting on the way home, but among other acquisitions may notice a Sparrowhawk, *A. nisus* undoubtedly, which in my experience is equally common with *A. badius* on these hills, where both species breed; *Merula Wardii*; *Oreocinclla dauma* and *O. mollissima*, both beautifully soft-plumaged Thrushes; *Turdus viscivorus*, and another member of the same family, which I did not make out at the time, but which proved to be *Geocichla unicolor*, and was the only example procured in this outing. Subsequently I shot it in many wide-apart localities, the Western Ghats among others. Of this group of the Thrush family another is represented on these hills, *G. citrina*; but we did not meet with it, although it is common at a lower elevation; and a third, *G. cyanotus*, occurs in the Malabar forests, and is by no means scarce at Mahableshwur.

(To be continued.)

NOTES ON THE VERTEBRATE ANIMALS OF LEICESTERSHIRE.

BY MONTAGU BROWNE, F.Z.S.
Curator, Town Museum, Leicester.

(Continued from p. 238.)

Order LIMICOLÆ.—Family ŒDICNEMIDÆ.

Œdicnemus scolopax (S. G. Gmelin). Stone Curlew.—Formerly occurring in the county as a summer migrant, but much scarcer of late years. It has been met with in the parishes of Croxton, Kerriel, Saltby, and Waltham, on the south-eastern side of the county. The late Mr. Widdowson noted it as having bred annually some years ago at Stonesby Heath, but none have been observed there of late years.

Rev. R. Hart writes that “the Thick-kneed Plover still breeds on Ryhall Heath, Rutland.”

Family GLAREOLIDÆ.

Glareola pratincola (Linn.). Collared Pratincole.—The only authority I have for including this bird in the present list is that contained in the MS. catalogue of the contents of the Museum when handed over to the Corporation on 19th June, 1849, wherein one is mentioned with the remark, “shot near Leicester.”

Family CHARADRIIDÆ.

Cursorius gallicus (Gmelin). Cream-coloured Courser.—This rare bird is figured in Potter’s ‘History of Charnwood Forest,’ from a specimen in the possession of the Rev. T. Gisborne, of Yoxall Lodge, Staffordshire, procured near Timberwood Hill, Charnwood Forest, in October, 1827. The same specimen has also been figured by Bewick and Selby. Anxious, if possible, to obtain some particulars of so rare a bird, Harley wrote to the late Mr. Gisborne, author of ‘Walks in a Forest,’ in whose possession it was known to be, and received the following reply:—“Yoxall Lodge, Needwood Forest, July 4, 1840. The example of *Cursorius isabellinus*, respecting which you inquire, was shot on Charnwood Forest, near Timberwood Hill, in October, 1827, by a tenant of my eldest son. The tenant met my son accidentally directly afterward, and showed and gave the

bird to him as an unknown curiosity; and my son, who was on his way to this neighbourhood, brought it forward to me."

Charadrius pluvialis, Linn. Golden Plover.—A winter visitant, between October and March, not common, and chiefly confined to Charnwood Forest and the wild hills around. Occasionally, however, it is found on the meadow lands which fringe the River Soar. It has been noted at Coleorton, Smeeton, Gumley, and Foxton. Mr. Davenport saw a flock of about fifty on March 15th, 1883, and others have been met with in the Vale of Belvoir, in the Abbey Meadow, and in a field just off Saffron Lane, Aylestone, where sixty or more were counted in a flock. Mr. W. J. Horn saw some near Uppingham, Rutland, February 14th, 1886.

Ægialitis hiaticula (Linn). Ringed Plover; Ring Dotterel.—A rare summer visitant. It has, however, occurred several times in the Abbey Meadow as well as in the meadows at Belgrave, and I was fortunate enough to shoot a specimen (an immature female) at Thornton Reservoir on September 25th, 1884. The Rev. Churchill Babington states that it has been killed at Groby by the keeper of the Earl of Stamford (see Potter's 'History of Charnwood Forest').

Eudromias morinellus (Linn). Dotterel.—Formerly occurring in the county as a spring and autumn migrant. The Rev. Churchill Babington states that five were brought down at a shot by Mr. Tomlinson, jun., at Charnwood Heath, and that Miss Watkinson, of Woodhouse, had one, taken near Buddon Wood." Sir George Beaumont possesses a specimen killed near Coleorton, and Mr. Potter, of Billesdon, reports two shot at Ilston, by Mr. J. Allen, of Frisby Lodge.

Vanellus vulgaris (Bechstein). Lapwing.—Resident, generally distributed and breeding. In winter it is often met with in large flocks. Mr. Davenport writes:—"In April, 1884, I remarked a cock and two hen Lapwings frequenting a ploughed field for some little time; eventually I found the two nests on the same morning, within ten yards of each other, each nest containing four fresh eggs. I am sure there was only one male bird with the two hens. On November 4th, 1885, Lapwings were reported to be flocking in meadows by the Aylestone-road Gas Works, and the next day—the floods being 'out'—I saw several flocks of some six or seven hundred or more congregated in meadows opposite the Aylestone-road Mill."

Streptilas interpres (Linn.). Turnstone. — An accidental visitant. Turner received a male and female shot at the Abbey Meadow four or five years ago, and I saw a young one on Feb. 2nd, 1884, which had been shot in the Abbey Meadow in the spring of 1883; also an old one shot at the same time and place.

Hæmatopus ostralegus, Linn. Oystercatcher. — A rare and accidental visitor. Harley states that one occurred at Loughborough in the year 1840, and Mr. G. H. Finch, M.P., of Burley-on-the-Hill, Oakham, Rutland, informs me that one was killed there by his keeper some years since.

Family SCOLOPACIDÆ.

Recurvirostra avocetta, Linn. Avocet. — Mr. Wolley, of Beeston, saw a specimen of this rare visitor while fishing near the confluence of the Soar with the Trent in June, 1856 (see 'Zoologist,' 1856, p. 5280). It passed over his head, giving a distinct view of its upturned bill.

Phalaropus fulicarius (Linn.). Grey Phalarope. — Of uncertain occurrence. Harley states that during the autumn of 1841 and the following winter several were captured throughout the county. The species occurred again in the autumn of 1846, and also in Dec., 1853, when a fine specimen was shot by Mr. Bloxam, of Twycross. Moreover, towards the close of 1854 it appeared at Foxton, where one was shot on the canal which passes through that village. Another, killed by Rev. H. Matthews, at Foxton, in the winter of 1860, is now in the possession of the Rev. A. Matthews.

Scolopax rusticula, Linn. Woodcock. — A winter migrant, not very common; occasionally remaining to breed in Martenshaw, and also in the woods at Donnington Park in the northern division of the county, at Coleorton and in Owston Wood. Mr. Davenport shot a very light-coloured variety in Cold Overton Wood in Dec., 1883.

Gallinago major (Gmelin). Great Snipe; Solitary Snipe; Double Snipe. — A rare winter visitant. According to Harley, Mr. Chaplin, of Groby, shot one in Martenshaw Wood during the winter of 1838. Another was killed near Lutterworth some years ago by Mr. Sansome, of that town. A third was obtained at Noseley a few years since, and a fourth in 1879, near Smeeton, by Mr. Elliott. Last winter one was picked up dead at Billesdon,

and has been preserved. It appeared to have died from want, as it was quite uninjured. The late Mr. Widdowson's diary contains a record of one killed at Little Dalby on Sept. 28th, 1868. On September 2nd, 1885, Mr. A. Ross, of Leicester, whilst shooting over the Garthorpe Estate, near Melton Mowbray, killed a Great or "Solitary" Snipe, which his dog pointed in a clover field, and, as is usual with this species, at some considerable distance from water. The specimen, a fine dark-plumaged one, weighing nearly 8 oz., was presented by Mr. Ross to the Leicester Museum. This was recorded in 'The Field' for Sept. 12, 1885. I saw, in the possession of a man named Ludlam, a Great Snipe which had been shot by Mr. J. C. A. Richards, in a field at Blaby, during the first week in September, 1885. Mr. G. H. Finch, M.P., of Burley-on-the-Hill, Oakham, Rutland, reports that a specimen was shot in his neighbourhood.

Gallinago cælestis (Frenzel). Common Snipe; Full Snipe.—Generally distributed, but not so common as formerly.

Limnocryptes gallinula (Linn). Jack Snipe; Half Snipe.—A winter visitant, generally distributed, but not very common.

Tringa alpina, Linn. Dunlin; Stint.—An uncommon spring and autumn visitant. Specimens have been obtained at Bosworth, Loughborough, and Saddington Reservoir. Mr. S. Bevans showed me four mounted specimens which were shot by him in the Abbey Meadow seven or eight years ago, and I purchased one which was said also to have been killed in the Abbey Meadow some years ago. Two others, which I saw in the flesh in winter plumage, were shot at Fleckney by Mr. C. Allsop on Oct. 20th, 1885.

Tringa minuta (Leisler). Little Stint.—Two of these rare little waders were shot out of a party of five on September 22nd, 1885, at Saddington Reservoir, by my friend Mr. Macaulay, who generously presented them to the Leicester Museum. The largest of the two, an immature female, containing small eggs, weighed 352 grs.; total length, $6\frac{1}{4}$ inches; bill, 8-10ths of an inch; tarsus, 17-20ths of an inch; carpus to tip of wing, $4\frac{1}{8}$ inches. The other, also apparently an immature female, but rather difficult to determine, weighed $\frac{3}{4}$ oz. or 330 grs.; extreme length (tip of bill to end of tail), $5\frac{7}{8}$ inches; bill, 8-10ths of an inch; tarsus, 8-10ths of an inch; carpus to tip of wing, 4 inches. The occurrence of these was noted in the 'Field' of October 10th, 1885.

Tringa temmincki (Leisler). Temminck's Stint.—Macaulay records (Mid. Nat., 1882, p. 78), that a specimen of this bird was shot at Saddington Reservoir by Rev. H. Marriott, in March, 1860. It was seen and identified by Rev. A. Matthews, of Gumley.

Tringa subarquata (Güldenst). Curlew Sandpiper.—Harley writes :—"The appearance of this species of *Tringa* in the county, I am enabled to record on the testimony of a sportsman resident at Loughborough, who shot one on the banks of the Soar."

Calidris arenaria (Linn.). Sanderling.—Some years since, according to Harley, who examined them, three or four birds of this species were shot near the Reservoir in Charnwood Forest.

Tringoides hypoleucus (Linn.). Common Sandpiper.—A summer visitor. Potter, in his 'History of Charnwood Forest,' mentions Gracedieu and Groby Pool as localities for it. Harley says it bred on the banks of Groby Pool, as he learned from Mr. Chaplin, who found it there. Mr. Macaulay states that it breeds at Saddington Reservoir, but his only ground for this assertion is the fact of his having seen immature birds there during late summer. Mr. Bevans reports it as commonly occurring years ago in spring in the Abbey Meadow. I have received specimens from Saddington and Thornton Reservoirs, Wistow, Belgrave, and Aylestone. One which we shot at the latter place was merely wounded, and thereupon swam and dived with ease. It remains with us from the middle of April to the middle of September in ordinary seasons.

Helodromas ochropus (Linn.). Green Sandpiper.—A spring and autumn visitor, remaining sometimes during the winter. It has been noticed on the Soar and Trent, at Groby Pool, the Wreke, Smeeton Brook, and Saddington Reservoir. A mounted specimen was presented to the Town Museum on April 7th, 1851, by Mr. Job Glover, "killed in Leicestershire," presumably at Bagworth.

Totanus glareola (Gmelin). Wood Sandpiper.—Harley characterises this species as more rare and shy than its congener *H. ochropus*. It was met with during the winter of 1852-3, and it occurred also at Groby Pool in 1840.

Totanus fuscus (Linn.). Spotted Redshank.—One in the collection of Mr. J. Whitaker, of Rainworth, Notts, is said to have been shot at Thornton Reservoir in September, 1880.

Totanus canescens (Gmelin). Greenshank.—Has been shot on the banks of Groby Pool, and also at Swithland. Yarrell, on

the authority of a resident at Melton Mowbray, stated that it is not uncommon in the more eastern parts of the county. I saw a specimen in the possession of Dr. Elkington shot at Enderby in September, 1885.

Limosa lapponica (Linn.). Bar-tailed Godwit.—Potter, in his 'History of Charnwood Forest,' says, "One in winter plumage was shot in the meadows near Swarkestone, and is preserved at Coleorton Hall, the seat of Sir G. Beaumont, Bart."

Limosa ægocephala (Linn.). Black-tailed Godwit.—On the authority of Mr. Evans, of Market Bosworth, Harley recorded a specimen shot in the vicinity of Market Bosworth, and a second at Osbaston. There is a specimen in the Leicester Museum in summer plumage marked "Leicestershire, 1869."

Numenius phæopus (Linn.). Whimbrel.—The Rev. Churchill Babington's "List of Birds," in Potter's 'History of Charnwood,' includes a specimen of this bird shot near Charnwood Heath. Harley says "it occurs occasionally in small numbers, in the meadows about Loughborough, at Bosworth, and elsewhere in the county. One was killed near Leicester, April 23rd, 1856."

Numenius arquata (Linn.). Curlew.—According to the Rev. Churchill Babington, one shot at Benscliff is preserved at Rothley Temple. Harley states that before the Forest of Charnwood was enclosed the Curlew was plentiful there. The MS. Donation Book of the Leicester Town Museum records the gift, on October 2nd, 1865, by Mr. H. B. Chamberlain, of a Curlew shot at Desford.

(To be continued.)

NOTES AND QUERIES.

MAMMALIA.

White Fox in Somersetshire.—The specimen recorded by Mr. Cecil Smith (p. 104), as taken on Mr. Esdaile's property on the Quantock Hills, is not the first that has been seen in Somersetshire. About six years ago one of the best sportsmen in the county, whilst hunting with the Stag-hounds at Haddon, saw a White Fox in those woodlands. It had been disturbed by the tufters, and came along the pathway till within ten yards. Mr. Esdaile's specimen has been admirably set up by Mr. Rowland Ward, and is now on view in his window in Piccadilly.—JAMES TURNER (27, De Vere Gardens, Kensington).

Variety of the Mole.—An orange-coloured variety of the Mole was killed during the first week of May in the immediate vicinity of Oxford.—ARTHUR H. MACPHERSON (51, Gloucester Place, Hyde Park, W.).

Black Variety of the Short-tailed Field Mouse.—On June 25th a black variety of the Short-tailed Field Vole, *Arvicola agrestis*, was killed in a clover-field in this parish by some haymakers. It was a female suckling young ones, all of which were, according to the men, of the normal colour. The fur of this specimen is thick and abundant, and is of a rich shining black above, the under parts being just a shade lighter. This species seems to be rather subject to variation, the capture of white and cream-coloured examples having several times been recorded. Lord Clermont, in his 'Quadrupeds and Reptiles of Europe,' also mentions the occurrence of both black speckled individuals, but I believe these last to be more rarely met with.—G. T. ROPE (Blaxhall, Suffolk).

BIRDS.

Redshanks and Lapwings breeding in Chatham Dockyard.—These birds breed quite commonly in many of the grassy meadows on the banks of the Medway, between Chatham and Sheerness; but I dare say it will surprise many of your readers to hear that they breed in Her Majesty's Dockyard at Chatham. Nevertheless such is the fact. Upon our arrival at Chatham, early in May, I was told that there were several pairs of Plovers breeding upon a piece of waste ground between the large basins and the sea-wall, but as I could scarcely credit it I did not go to see until I heard the statement repeated; and then, accompanied by one of my messmates, who had already seen the nests, I visited the spot on the 11th of May. The piece of ground is about thirty acres in extent, covered with rough grass, and has one or two small muddy pools in it. It is in the form of a triangle, being bounded on one side by the river, on another by two large basins, and on the third side partly by small garden plots in the occupation of dockyard officials and partly by the extension works, where large numbers of convicts are daily employed. At every hundred yards or so by the sea-wall there is a sentry-box, where one of the prison warders keeps walking to and fro upon a raised platform all the time the convicts are at work. To get to these boxes these men have to cross this ground several times during the day. Besides this, H.M.S. 'Pembroke,' the admiral's flagship, lies in one of the basins not more than three hundred yards off, and the ground is being constantly used by the blue-jackets and marines of the ship for foot-ball, cricket, &c. No one would think this a likely breeding-place for such shy birds as Redshanks and Lapwings. However, we had scarcely entered it when we heard the cry of a Lapwing, followed, a moment or two after, by that of a Redshank, and presently several pairs of each rose from the ground and flew round us in their usual

excited manner when their breeding-haunts are invaded. After a little search we found two Redshank's and one Lapwing's nests. The former were placed in tufts of grass, and were artfully concealed, the old bird appearing to push the blades of grass well over the nest when she leaves it. The Lapwing's nest was quite exposed upon a patch of bare ground, and contained the full complement of eggs, as did one of the Redshank's, while the other had three eggs. There were three or four pairs of Lapwings, and six or seven pairs of Redshanks. Besides the nests with eggs there were several depressions in other tufts of grass, where nests had evidently been commenced. A few days later the nest containing three eggs had its full complement; and another nest, also with full complement of eggs, was found. In addition to these birds I noticed large numbers of Skylarks and Titlarks, a few pairs of Common Buntings and Yellow Wagtails, and one pair of Whinchats breeding in Chatham Yard. In the neighbourhood of Harwich, during the first week in June, I noticed Redshanks and Lapwings breeding in several localities; and on June 8th, on the shingle, near Felixstowe, there were a number of Ringed Plovers and a colony of Little Terns breeding. The latter had young, as most of the old birds were carrying small fish; but I could find neither eggs nor young. The same day, while looking for larvæ of *Bombyx castrensis*, in a marshy field on the banks of the Stour, I nearly trod upon a young Lapwing as it was crouching in a tuft of grass; and a little farther on I found another. 'They were almost fully fledged, but the wing-feathers were not quite grown. I picked them up and took them to a piece of smooth turfy ground, where I set them down. They ran off at once in different directions; and as soon as they reached high grass they looked about for a convenient tuft and hid themselves. I caught them again and repeated the experiment several times, and always found that they ran off in opposite directions. Had there been four of them I suppose they would all have gone different ways; a wise provision of Nature, for it would not be possible to keep one's eyes on four at once.—GERVASE F. MATHEW (H.M.S. 'Penelope,' Berehaven).

Supposed Occurrence of the Icterine Warbler in Co. Wicklow.—While walking in Coollattin Park Woods on the 29th of May I heard and saw a bird which in every respect corresponded to the description of the Icterine Warbler (*Hypolais icterina*). I was attracted by a splendid bird-song which was quite new to me, and much superior to any that I had heard before, and soon discovered the utterer among the branches of a large oak. I watched the bird for a considerable time, and got a close view, so that it is hardly possible that I was mistaken as to its identity. But for its very superior song, I could hardly have distinguished the bird from our common Willow Warbler, but it was of a more decided yellow colour, and had a longer tail: it was also, like that bird, in continual

motion, chasing insects about the branches and frequently darting at them on the wing after the manner of the Flycatcher, pausing now and then to give forth its splendid notes. Often, while hopping among the branches, it would utter some detached twittering notes, but while singing in earnest it would remain perched, swelling its throat and agitating its whole body. The song sometimes began with a few rather harsh strains, but in general it was quite delightful, far surpassing in clearness and melody any other that I have heard. Its notes, heard from the top of the large oak in which it was, were as powerful as the loud strains of the Blackbirds and Thrushes, many of which were singing near, and it seemed wonderful that such sounds could be produced by so small a bird. After watching the bird for about half-an-hour I passed on, but, on returning to the same spot in about an hour's time, I could see or hear no sign of it, nor have I been able since, though I have frequently visited the place. As a specimen of the bird—the only conclusive means of proving such a case—has not been obtained, it is impossible to claim this as an authentic instance of the occurrence of the Icterine Warbler, yet the probable occurrence of so rare a bird is, I think, a matter decidedly worthy of note, especially in Ireland, which is less favoured than England by the presence of the rarer Warblers. As I am well acquainted with the Blackcap, and in some degree with the Wood Warbler, there is no fear of my having mistaken either of these for the bird in question, the power and infinite variety of its notes, as well as the yellow colour, excluding such a possibility. I have been told by the gamekeepers that the Common Weasel (*Mustela vulgaris*) is found in Coollattin Park, having been introduced from England among Earl Fitzwilliam's foxhounds. If this be the case a very interesting addition has been made to our Irish mammalian fauna. I will make further inquiries about the matter, and try to obtain a specimen.—ALLAN ELLISON (Shillelagh).

Supposed Occurrence of the Icterine Warbler in Pembrokeshire.—Early in May I heard the notes of a bird which were quite strange to me in our shrubberies. The songster was high up, and concealed in thick foliage, and I did not catch sight of him. Since then a little bird has taken up his station in an ash tree just outside our grounds, by the roadside, at no great distance from where I first heard the unknown warbler, and sings a most delicious song all day long, to the delight of passers by, People who have once heard him return again and again to listen to his melody. The notes are very sweet and liquid, imitating some of the trills of the Song Thrush. Seen high up through the foliage of the ash, he looks like a Chiffchaff, and is very restless while he sings, dancing up and down the branch he may be upon. Occasionally he descends to lower parts of the tree, and then appears to be somewhat darker about the wings than a Chiffchaff; his breast seems of a pale yellow. He has never come close enough to afford me a clear view of his plumage, and I cannot take

steps to determine what he may be by shooting so sweet a songster who has been charming us all with his clear and tuneful notes. The other side of his hedge is a swampy cover, a regular jungle of furze, willow bushes, and young spruces, where I have searched several times unsuccessfully for the nest which, no doubt, is there. In my opinion our little warbler is no other than *Hypolais icterina*. My groom, who is a bird fancier, declares that he once heard a little bird singing a similar song in Somersetshire.—MURRAY A. MATHEW (Stone Hall, Wolfscastle, R.S.O., Pembrokeshire).

Ruddy Sheldrake near Limerick.—We have received for preservation a specimen of the Ruddy Sheldrake (*Tadorna rutila*) shot on the River Shannon, at Birdhill, about nine miles from Limerick. It is a female bird, one of a pair shot at the same time by Mr. Swiss, of Birdhill, and bears every appearance of being a wild bird. On making enquiries I am informed that both birds were very shy and difficult to approach. This is the second time that this species has come under our observation, having set up a specimen obtained near Tralee some years ago, which is now in the collection of Mr. J. C. Neligan of that place.—WILLIAMS & SON (Dublin).

[The Ruddy Sheldrake is so frequently kept amongst other ornamental water-fowl, and may so easily recover the use of clipped wings after moulting, that it is probable that most, if not all, of the specimens found at large are escaped birds. The fact of their being found in perfect plumage affords no proof of their being truly wild, for birds which have regained their liberty very soon get into good order, and ornamental-water fowl are generally in good condition.—ED.]

British Examples of the King Duck and Hooded Merganser at Oxford.—In the University Museum at Oxford there are examples of two rare British Birds, of which I can find no mention in the 'Handbook of British Birds' or the last edition of Yarrell's 'British Birds'; it may therefore be worth while to place them on record in the pages of 'The Zoologist.' An adult male King Duck is labelled "Erith Reach, Kent. Presented by Lord Saye and Sele." This specimen formed part of a collection of British birds bequeathed by the late Lord Saye and Sele to the Ashmolean Museum in 1487, and was labelled in that collection "Shot in Erith Reaches, Kent." An old male Hooded Merganser, placed on a stand with two females, has a label at the foot, "Adult male. Bristol, 1845. Rev. S. A. Pears." This bird also came from the Ashmolean Museum (where it was labelled as at present), and it seems that nothing more is known of it. The Rev. Stuart Adolphus Pears was, at the date of the donation, a fellow of Corpus Christi College. To the keeper of the museum I am indebted for these particulars, which have been kindly communicated by Mr. G. A. Rowell, who remarks in reference to the Merganser, "Probably no one now living has the least knowledge on the subject."—OLIVER V. APLIN (Great Bourton).

Snow Bunting breeding in Scotland.—The nesting of the Snow Bunting in Scotland is now no longer doubtful, the young having been taken at the nest and the old birds seen within two yards of the observers. Notice will have been given of this at a meeting of the Inverness Field Club by the time this is printed, and a full account of this interesting discovery, as well as a history of the Snow Bunting in Scotland, will appear in a larger work, now in a forward condition of preparation, on the Fauna of Scotland. Materials for this have long been accumulating in our hands.—J. A. HARVIE BROWN (Dunipace, Larbert).

The Peregrine on the Kentish Coast.—A few weeks ago, while watching the Gulls at Dover, I saw a pair of Peregrine Falcons, and was informed by one of the coastguards that they nest there every year, and commit great havoc among the young Gulls. I was lying on the top of the cliff watching the Gulls below, when I suddenly became aware of a commotion among the birds some distance from me, and on looking in that direction I saw a male Peregrine making repeated stoops at the young Gulls, while the old ones had joined together to drive him away, and in this, after some little time, they succeeded, one fine old Gull following the Peregrine for some distance. I afterwards saw the Falcon making stoops at the Swifts, of which numbers breed in the cliffs; but they were too sharp to be caught. In Yorkshire I know of several regular nesting-places of the Peregrine, but was not aware that it nested annually near Dover.—RILEY FORTUNE (Alston House, Harrogate).

Unusual Site for a Sand Martin's Nest.—On the 20th May I observed a pair of Sand Martins flying up and down in front of my house. Never having seen a Sand Martin in this town before—the nearest colony being distant about two miles—I supposed they had come in to search for food, the weather being cold and wet at the time. I watched them day by day, expecting each day would be the last of their visit, until the 30th May, when, to my surprise, I saw one of the birds gathering material for a nest, and after a short time I saw the hole they had selected. Standing near the outskirts of the town is a stone wall about ten feet high, backed up with earth, in front of which passes a road; along this road is a considerable amount of traffic; any one passing on the footpath would literally brush against the wall. A row of detached houses stands between the wall and the open country. In this wall, about four feet from the ground, the nest was placed, at a distance of about two feet from the entrance. In a very short time the little boys discovered the nest. Owing to their interference the birds appear to have left the town.—WILLIAM J. HORN (Uppingham).

Edible Birds' Nests.—Permit me to give the result of some observations I made on this subject in the Solomon Islands. It will be remembered that it was the association of these nests with a so-called "fungoid

growth" in the caves of North Borneo ('Zoologist,' 1885, p. 43) that led Mr. Pryer to consider that he had found the source of the material of which the nests are made, a supposed discovery which led to the re-opening of the controversy ('Nature,' vol. xxx., p. 271). This low plant-substance was determined by Mr. George Murray to be the result of the growth of a microscopic alga, a species, probably new, of *Glæocapsa* (Proc. Zool. Soc., 1884, p. 532; 'Zoologist,' 1885, p. 147). In the Solomon Islands I was only able to obtain the edible nest in one locality (Oima Atoll), since the bird usually frequents inaccessible sea-caves and cliffs. The nests were of inferior quality, and were for the most part composed of fibrous materials derived from the vegetable drift (the husks of pandanus seeds especially). The gelatinous substance thickly incrusting the interior of the nests and attached them to the rock. The surface of a cliff in the vicinity of the cave frequented by the swifts was coated by a reddish gum-like growth, which proved on examination to be an aggregation of the cells of a protophytic alga about 1-2500 of an inch in size. Unfortunately, my specimens of this growth have miscarried, but I feel assured that it is very similar to that observed by Mr. Pryer in the Borneo caves, samples of which, through the kindness of Mr. George Murray, I had the opportunity of seeing at the British Museum. A similar growth is commonly to be found coating the coral limestone cliffs in this group. It may be seen in all stages, the older portions being dark-coloured and rather tough, and the fresher portions being, as Mr. Pryer aptly remarked, like half-melted gum tragacanth. There are but few cells in the fresh alga, the mass being apparently composed of cellular debris, immersed in a rather diffuent material, the whole somewhat resembling the third section given in Mr. Green's paper ('Nature,' 1886, p. 81). That the salivary glands are especially concerned in the production of the gelatinous nest-substance there can now be but little doubt, and the investigations of Mr. Green have established the nature of its composition; yet it is possible, and I make the suggestion with great diffidence, that a *vegetable mucin*, or a substance closely allied to this animal product, may be found in these low plant-growths.—H. B. GUPPY (95, Albert Street, N.W.)

Habits of the Emu as observed in Confinement.—The breeding habits of the Emu are thus described in a letter to 'Nature' from Mr. Alfred W. Bennett, who had an opportunity of watching the habits of this bird, which was, during several seasons, successfully bred by his father in Surrey. The hen bird, says Mr. Bennett, begins to lay about the end of October or beginning of November, and as each brood consists of twenty eggs or more, laid at intervals of two days, the process takes about six weeks. Before it is completed the cock bird begins to sit. The eggs laid subsequently are deposited by the hen by the side of her mate, who puts out his foot and draws them under him. As soon as the eggs begin to

hatch it is necessary to isolate the hen, as she fights furiously with her mate, and would to all appearance kill the chicks if she were allowed to get at them. The whole of the tending of the young is performed by the male bird. This is not the case with the Ostrich, as some have reported.

Hybrids between the Black Grouse and the Pheasant.—In Yarrell's 'British Birds,' 4th ed. vol iii. p. 69 *seq.*, a number of hybrids between the cock Pheasant and the Grey Hen are enumerated as having occurred in England. Being desirous to give a life-sized and coloured figure of such a hybrid in my forthcoming work on the Black Grouse, the Capercailzie, and their allies, I wish to borrow a specimen for a short time, and, as my endeavours to procure one have so far been unsuccessful, I beg to make this known through your widely-read journal, hoping that some fortunate possessor may be kind enough to communicate with me concerning his willingness to lend me a specimen for the said purpose.—A. B. MEYER (Royal Zoological Museum, Dresden, July 5).

Oaks planted by Crows.—Referring to the extract given, at p. 264, from Robinson's 'Natural History of Cumberland,' in which we are told of a grove of oaks of a height for Crows to build in, though but of twenty-five years' growth, and, strange to say, planted by these birds. Although the manner of planting the acorns is described, no attempt is made to account for it. I am therefore induced to refer to what came under my observation respecting Rooks when residing on the north-east coast of Scotland in 1858. I observed that as soon as the Rooks had secured the object of their search (fir-cones), they alighted with them on an open space, and commenced striking and tearing them with their bills; this operation over, they returned to the wood for a fresh supply. Seeing a number of fir-cones strewn about the ground, they were carefully examined, and in some a maggot was found, on which the Rooks were doubtless feeding. It occurred to me at the time, and I noted down, that the stunted firs scattered over the plain might have sprung from cones trodden under foot by cattle, of a wet season, to become in the course of ages nesting-trees for the Rooks, and a shelter for cattle. My observations and remarks with regard to the planting were mere conjectures. That we are indebted to birds for the distribution of various plants, as well as for (to some extent at least) the soil in which they grow, is a well-known fact.—HENRY HADFIELD (Ventnor, Isle of Wight).

Variation in size of the Water Rail.—The Water Rail, like many other birds, has been observed to vary greatly in size, but I do not know that any very great difference in the size of two bones of this species has been remarked upon. The case of two Water Rails has lately come under my notice, in which the sterna vary in such a remarkable degree that it may be worth recording. The following are the measurements:—Keel of

sternum, measured along the curve: No. 1, 1.25 in.; No. 2, 1.75 in. Keel, measured in a straight line: No. 1, 1.20 in.; No. 2, 1.65 in. Length of sternum and coracoids: No. 1, 2.05 in.; No. 2, 2.50 in. The smaller sternum I took from a male, procured here in November last, which measured in the flesh 10.3 in. in length; wing, 4.2 in.; bill, from the gape, 1.4 in. I did not obtain the skin of the bird from which the larger bone was taken, but it was an average large-sized example, certainly nothing out of the ordinary way, and apparently about the size of an example shot here in December, 1878, the skin of which measures 11.9 in.; wing, 4.8 in.; bill, from gape, 1.7 in. A male from Sussex, November, 1883, measured in the flesh 12.0 in.; wing, 4.8 in.; bill, from gape, 1.8 in. Although the larger birds are (here at least) much more commonly met with, I have seen several examples of the smaller one lately, and obtained another sternum not any longer than that described here.—OLIVER V. APLIN (Great Bourton, Oxon).

Young Rooks with white Chins.—For some years past I have noticed that a considerable number of the young Rooks shot at Rook-shooting time have a small spot of white between the rami of the lower mandible—that is to say, on the chin. This peculiarity is well known to Rook-shooters, but, so far as I am aware, it has hitherto escaped the notice of ornithologists. This spring, therefore, I have been endeavouring to learn what proportion of the birds have the white spot, and whether it is in any way a mark of sex. The area covered by the white feathers varies much in size. For it to be as large as a farthing is exceptional. Often there are only a few stray white feathers. One which I have seen, however, had the spot as large as a halfpenny. The beaks of those birds having the white spot are generally much lighter in colour than the beaks of those without it. Of thirteen young Rooks shot at this place one evening during the third week in May no less than nine had the white spot. Of 111 examined a few days later, in company with Mr. H. L. Wilson, on one of the stalls in Birmingham Market, only forty-one had the spot, while the remaining seventy had not. Of fifty-eight examined on another stall (in all probability from a different rookery) twenty-eight had the spot, while thirty had not. Altogether, therefore, out of 191 birds examined, seventy-eight (or considerably less than one-half) had the white chin spot. We opened three of those with the spot, of which two were females and one a male. Two without the spot proved a male and a female. Clearly, therefore, the presence or absence of the spot is no guide to the sex of a bird. This curious white spot is of interest in connection with the discussion formerly carried on as to the cause of Rooks losing the feathers round the base of the bill, for it should be noted that these white feathers are among those which are lost in the adult bird. The only reference to the white spot which Mr. Wilson or myself have discovered is by Mr. Morris, who, speaking of white and pied

varieties, says :—" One I have lately seen—a young bird—had a patch of pure white under the bill, and one or more of the quill-feathers also white." —R. MILLER CHRISTY (Chignal St. James, Chelmsford).

BATRACHIA.

Enemies of the Frog.—When living at Mackay, Queensland, I frequently observed that the common House-frogs, *H. cærulea*, were injured in the hind limbs, and on several occasions I would hear them croaking in pain; but on arrival all I saw would be a wretched exhausted frog weakly hopping away with a wound in the hind leg, from which the blood would be oozing. Later on I found that Rats attack the Frogs. The Rats catch the Frog by the hind leg, and apparently suck the wound they cause, then let the Frog crawl away, attack it and suck it again, and so on until the Rat has had enough. I believe the Rats suck the blood, because I was never able to discover a Frog so attacked on which the flesh had been destroyed. Mr. W. P. Fletcher, a well-known local naturalist, once gave me the following account of a Mantis attacking a Frog. It was in the autumn of 1877, at Rockhampton, Queensland. He was "attracted by hearing the noise of a Frog in distress, in the daytime, in some garden-shrubs about six feet high: he went to see the cause, and found a green Frog about two inches long. A green Mantis about five inches long, with one claw had hold of it across the neck, so that the Frog could not move, and the Mantis was chewing, and did chew off, the hind leg, the blood flowing profusely." He called Mrs. Fletcher to see them, and then destroyed the Mantis, whereon the Frog crawled away. At Lake Elphinstone (100 miles from Mackay) I once found a small Frog, *H. rubella*, in the house in a very exhausted condition; on examination I found a large Leech on its tongue. This specimen, with the Leech attached, I gave to Mr. Boulenger at the British Museum, where it can be seen. At Mackay the chief enemies of the Frogs appeared to be the Snakes and the *Agamidæ*.—H. LING ROTH (48, Wimpole St., W.).

REPTILES.

Viper swallowing its Young.—The attention of a woodman in my employ, who was trimming the sides of a neighbouring wood, was attracted by a hissing noise at his feet; on looking down he saw a large Viper lying distended in a cart-rut in the act of receiving five young Vipers into its mouth, which he distinctly saw the reptile open wide before the first of the five crawled in. It was immediately dispatched, and on cutting the body open the woodman found the young ones alive and wriggling some distance down, and still further towards the posterior end an entirely uninjured and undigested Shrew-mouse. This is one of the most authentic corroborations of the vexed question whether or not the Viper receives its young into its mouth when in danger.—J. C. MANSEL-PLYDELL (Whatecombe, Blandford).

FISHES.

Opah or King Fish in Shetland.—An Opah, or King-fish, *Zeus luna*, which is exceedingly rare, was recently caught off the Shetland Islands, and brought to the Colonial and Indian Exhibition for inspection. The specimen, which is in perfect condition, measures about five feet in length, and weighs 160 pounds. The colours of the sides and back are dark green intermingled with gold and purple, while the irides are red. The Opah possesses peculiar migratory propensities, being found even in Eastern seas. Its habits seem to be little known, but Mr. W. August Carter, of the Colonial and Indian Exhibition, states that, according to inquiries and investigations he has made, the Opah varies its diet according to the locality it inhabits, and that when visiting the British Islands it feeds chiefly upon herrings and cuttle-fish.—*Nature*.

MOLLUSCA.

Arion subfuscus and Helix hispida var. fusca in Yorkshire.—On June 2nd I found three specimens of *Arion subfuscus*, Drap., in a garden at Lofthouse. The species is well marked, being of an orange-brown colour, the shield somewhat brighter and clearer than the other parts. It is larger than *A. hortensis*, and it is surprising that the species has been so long overlooked. As it is apparently not rare, it must have been taken for a yellow variety of *A. hortensis*. I sent the three specimens to Mr. Cockerell, of Chiswick, who identified them for me. Together with a few other slugs and shells I sent a few specimens of *Helix hispida*, which Mr. Cockerell states are Mencke's variety *fusca*, well known on the Continent, but which does not appear to have been previously recognised in the British Isles.—GEORGE ROBERTS (Lofthouse, Wakefield).

Limax arborum and the influence of altitude on Colour.—It has been observed that in this species, as in some others, individuals found in cold regions, or at great altitudes, are invariably darker, and have their markings more suffused than those of the warmer or less elevated regions. Two very striking instances of this have recently come under my notice, and seem to me to deserve recording. The Rev. A. H. Delap, sending me slugs from the neighbourhood of Clonmel, Ireland, has included specimens of *L. arborum* from the plains of North Waterford, which are distinctly and beautifully spotted with black, where he says they are locally abundant, and the ordinary form of England and Scotland had not been met with. But one day he ascended the Reeks (in Waterford), and a hundred feet from the summit he met with the English type of the species; and at the extreme summit, 2300 feet above the sea-level, he found examples of a grey-black form in which the markings were entirely suffused over the body and rendered invisible. This is the more interesting, because in the

plains of Italy the type-form is prevalent, but, just as in Waterford, the dark variety is only found high up on the mountains, ascending to nearly 8200 feet. The other instance is that of *L. maximus* in the South of England. Mr. J. H. James has carefully searched Truro for varieties of this slug, and it is remarkable that all he has found there were distinctly spotted or striped with black or dark grey. These forms, so common in Cornwall, are either rare or absent in the colder Thames Valley, all our examples being dull and ill-marked, the almost unicoloured variety prevailing. Similarly, in the case of *Arion ater*, the variety in which the colours are distinct and well-defined, occurs at Truro, near Clonmel, and in various other localities in the south-west, but seems to be entirely absent in the Thames Valley.—T. D. A. COCKERELL (Bedford Park, Chiswick).

SCIENTIFIC SOCIETIES.

ZOOLOGICAL SOCIETY OF LONDON.

June 29, 1886.—OSBERT SALVIN, Esq., F.R.S., Vice-President, in the chair.

The Secretary exhibited, on behalf of Mr. John Brazier, of Sydney, New South Wales, a series of eggs of the Pacific Porphyrio, *Porphyrio vitiensis*; and read a note showing the extraordinary fecundity of an individual of this species, which had laid in seven years 491 eggs.

The Secretary read a letter addressed to him by Capt. Vipan, giving particulars of the nesting of a South-American Siluroid Fish, *Callichthys littoralis*, in his aquarium.

A communication was read from Mr. Gilbert C. Bourne, containing general observations on the fauna of Diego Garcia, the southernmost island of the Chagos Group, situated in the centre of the Indian Ocean.

Mr. Howard Saunders read a paper containing a description of the collection of birds obtained by Mr. Gilbert C. Bourne on the island of Diego Garcia. The species represented in the collection were stated to be fourteen in number, of which one only was a land-bird (introduced), the remainder being oceanic birds or migrants of wide distribution.

Mr. J. Bland Sutton read a paper on the intervertebral disk between the odontoid process and the centrum of the axis in man.

Prof. R. Ramsay Wright gave an account of *Sphyrnanura Osleri*, a recently-discovered ectoparasitic Trematode, intermediate between *Gyrodactylus* and *Palystomum*, which infests the gills and skin of *Menobranchus*.

A communication was read from Mr. Gervase F. Mathew, R.N., containing descriptions of a new genus and some new species of Rhopalocera which he had obtained during a recent visit to the Solomon Islands.

Mr. R. Bowdler Sharpe read a paper containing an account of a collection of birds from Perak, which contained examples of several forms hitherto only known from Sumatra.

A second paper by Mr. Sharpe continued the series of his notes on the specimens in the Hume Collection of Birds in the British Museum. The present communication treated of some of the Rose Finches, of *Lalage melanothorax*, and of some Flycatchers of the genus *Siphia*.

Mr. Arthur G. Butler read a paper on a series of Lepidoptera collected by Major Yerbury at Campbellpore, Western India. The collection contained examples of 177 species, many of them represented by a fair series of specimens. Six of the Butterflies and nineteen of the Moths were described as new.

Mr. Sclater read a list of a collection of birds obtained by Mr. H. Berkeley James from the province of Tarapacà, Northern Chili. The collection contained 147 skins, referable to 52 species, amongst which was a new three-toed Flamingo of special interest, which was proposed to be called *Phænicopterus Jamesi*.

Mr. A. Smith Woodward read a note on the presence of a columella (epipterygoid) in the skull of Ichthyosaurus.

Mr. Herbert Druce read a paper containing the description of some new species of Heterocera from Tropical Africa.

Mr. Boulenger read a report on the additions made to the Batrachian Collection in the Natural History Museum since the publication of his catalogue. To the report were added descriptions of some new species, the most interesting of which was a new Newt, *Geomolge Fischeri*, from the Ussuri River, Mantchuria.

This meeting closes the present session. The next session (1886-87) will commence in November next.—P. L. SCLATER.

ENTOMOLOGICAL SOCIETY OF LONDON.

July 7, 1886.—J. JENNER WEIR, Esq., F.L.S., Vice-President, in the chair.

Mr. S. H. Scudder, of Cambridge, Mass., United States, was elected a Foreign Member of the Society.

The Rev. H. S. Gorham exhibited specimens of *Eucnemis capucina* (Ahr.), a species new to Britain, discovered in June last in an old beech tree in the New Forest. He also exhibited specimens of *Cassida chloris*.

Dr. Sharp exhibited larvæ of *Meloë*, and read notes on their habits; and Mr. Saunders exhibited a specimen of *Halictus* infested with about thirty *Meloë* larvæ.

Mr. Billups remarked that he had recently found forty-seven larvæ of *Meloë* on the body of a specimen of *Eucera longicornis*.

Dr. Sharp said that he was of opinion that the operations of these larvæ were not the result of instinct, but were more like reflex actions; the instant the larvæ touched a suitable surface they clung to it. The discussion was continued by Prof. Riley, who disagreed with Dr. Sharp, and believed these larvæ were guided by instinct, as they showed a decided preference for particular hosts.

Mr. Jenner Weir exhibited a male of *Lycæna bellargus* and a female of *L. icarus*, which had been captured *in copulâ* by Mr. Hillman, and shown to the exhibitor at the time of capture. Mr. Weir also exhibited some specimens of *Lycæna* which he believed to be hybrids between *Lycæna bellargus* and *L. icarus*; and he further exhibited, on behalf of Mr. Jenner, four specimens of *Phosphæus hemipterus*, taken at Lewes.

The Rev. W. W. Fowler exhibited two specimens of *Chrysomela cerealis*, lately taken by Dr. Ellis on Snowdon; and also two specimens of *Actocharis Readingii*, found at Falmouth by Mr. J. J. Walker.

Mr. E. B. Poulton called attention to the fact that the larvæ of some Lepidoptera, if fed in captivity on an unusual food-plant, subsequently refused to eat their ordinary food-plant. He stated that he had observed this with the larvæ of *Pygæra bucephala* and *Smerinthus ocellatus*. Mr. Stainton, Mr. Fowler, and others made some remarks on the subject.

Mr. Elisha exhibited a series of bred specimens of *Geometra smaragdaria*, together with the cocoons, containing the empty pupa-cases, attached to the stems of the food-plant.

Mons. Alfred Wailly, who was present as a visitor, exhibited a long series of silk-producing moths, including some remarkable hybrids between *P. cecropia* and *P. ceanothi*; and Professor Riley and Mr. Weir made some observations on these hybrids.

Dr. Sharp read a paper on "*Eucnemis capucina* (Ahr.) and its larva."

Mr. Dunning read a report on the subject of the importation of humble-bees into New Zealand, from which it appeared that the efforts of Mr. Nottidge, of Ashford, and the Canterbury (N. Z.) Acclimatisation Society, had been successful, and that the long-wanted clover-fertiliser had at length been established in New Zealand.

Mons. Peringuey communicated "Notes on some Coleopterous Insects of the family *Paussidæ*."

Mr. J. B. Bridgman communicated "Additions to the Rev. T. A. Marshall's Catalogue of British Ichneumonidæ."

Prof. Riley read "Notes on the phytophagic habit, and on alternation of generation, in the genus *Isosoma*." In this paper Prof. Riley described, from direct observation, the phytophagic habit in two species of the genus. —HERBERT GOSS, *Secretary*.



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ON THE FORMER OCCURRENCE OF THE WILD BOAR IN BUCKINGHAMSHIRE.

BY THE EDITOR.

IN the chapter on the Wild Boar in my work on 'Extinct British Animals' (1880), I have referred to some of the legends which exist in different parts of the country concerning famous Wild Boars which infested certain districts, and which, after doing a great deal of damage to crops, and sometimes to huntsmen and hounds, were at length killed by the prowess of some individual whose name in consequence has been immortalized in the district. One of the most celebrated stories of the kind (*op. cit.*, p. 80) relates to a Boar which was killed in the Forest of Bernwood, near Brill, where Edward the Confessor had a royal palace, to which he often resorted to enjoy the chase.

In the same county (Buckinghamshire), as appears by some privately-printed researches of Mr. Stephen Tucker, Somerset Herald in Ordinary, an enormous Boar at one time devastated the Manor of Chetwode. The ultimate destruction of this animal gave rise to the institution of a singular toll, known as the Rhyne (Common) Toll, which extended to nine townships, and was an annual tax upon cattle passing through upon the drift between October 29th and November 7th.

A very interesting account of this is given by Mr. Tucker in his 'Pedigree of the Family of Chetwode.'* As only fifty copies,

* Pedigree of the Family of Chetwode of Chetwode, Co. Bucks, &c. With their charters and other evidences. To which is added a Report and Papers

however, of this Pedigree have been printed for private distribution, I have obtained Mr. Tucker's permission to make the facts relating to the Wild Boar and the Rhyne Toll more generally known to naturalists and others by reprinting his remarks thereon in 'The Zoologist.'

He says :—"Many ancient rights and customs, which have long since lost much of their significance, and perhaps now appear to modern notions ridiculous, are nevertheless valuable in connection with history. They often confirm and illustrate facts, which, from the altered state of the country, would otherwise be unintelligible, and perhaps at the present day discredited. Such a custom or privilege is still possessed, and was till recently exercised by the lords of the manor of Chetwode, in Bucks, which, although very curious both in its origin and observance, has escaped the notice of Blount and other writers on the jocular customs of manors.

The manor of Chetwode—a small village about five miles from Buckingham—has been the property of the Chetwode family from Saxon times. Though of small extent, it is the paramount manor of a liberty or district embracing several other manors and villages which are required to do suit and service at the court leet held at Chetwode every three years. The lord of Chetwode has also the right to levy a yearly tax, called the "Rhyne Toll," on all cattle found within this liberty between the 30th of October and the 7th of November, both days inclusive. The commencement of the toll, which was proclaimed with much ceremony, is thus described in the record of a trial in the reign of Queen Elizabeth :—

"In the beginning of the said Drift of the Common, or Rhyne, first at their going forth, they shall blow a welke-shell, or horne, immediately after the sunrising at the mansion-house of the manor of Chetwode, and then in their going about they shall blow their horne the second time in the field between Newton Purcell and Barton Hartshorne, in the said county of Bucks; and also shall blow their horne a third time at a place near the town of Finmere, in the county of Oxford; and they shall blow their horne the fourth time at a certain stone in the market of the town of Buckingham, and there to give the poor sixpence; and so, going forward in this manner about the said Drift, shall blow

connected with their claim to the Barony of De Wahull, and an Account of the Chetwode Rhyne Toll. By Stephen Tucker, Esq., Somerset Herald in Ordinary. Fifty copies only: privately printed, 1884.

their horne at several bridges called Thornborough Bridge, King's Bridge, and Bridge Mill. And also they shall blow their horne at the Pound Gate, called the Lord's Pound, in the parish of Chetwode. And also (the Lord of Chetwode) has always been used by his officers and servants to drive away all foreign cattle that shall be found within the said parishes, fields, &c., to impound the same in any pound of the said towns, and to take for every one of the said foreign beasts twopence for the mouth and one penny for a foot for every one of the said beasts; and further, that the said officers and servants have always been used to take all cattle so taken and impounded by them within three days to the Lord's Pound at Chetwode, and if any cattle shall remain in the pound at Chetwode, and not be claimed at the end of the next three days, then the next day following, after the rising of the sun, the bailiff or officers of the lord for the time being, shall blow their horne three times at the gate of the said pound, and make proclamation that if any persons lack any cattle that shall be in in the same pound, let them come and shew the marks of the same cattle so claimed by them, and they shall have them, paying unto the lord his money in the manner and form before mentioned, otherwise the said cattle that shall so remain shall be the lord's as strays." This toll was formerly so rigidly enforced, that if the owner of cattle so impounded made his claim immediately after the proclamation was over, he was refused them, except by paying their full market price; and if he would not give the required sum, or none came forward, the cattle were at once driven to Warkworth, in Northamptonshire, and sold; whence arose a popular saying at Chetwode, that "Cattle that drank of Warkworth water never came back to Bucks."

The toll was collected till the inheritance of the present baronet. The following letter was addressed to Sir George Chetwode on this subject from his agents:—

"Buckingham, 19th February, 1875.

"Sir George,—Mr. Meadows* having informed us that you had decided not to revive the collection of the Rhyne Toll, but would accept the shells we had obtained on the death of the old collector of the toll, we have packed them in a box just as we received them, and we are very pleased to present them to you, to be preserved among the relics of Chetwode. At the same time it may be interesting to you to have an account of the ancient right.

* Agent at Oakley.

given to us in 1846 (when we received the Chetwode rents), by the same old collector, William Giles, who at the time rented the Rhyne (or Rhine) toll at £6 per annum.

"The Rhyne Toll commences at 12 p.m. on the 29th October (morning of 30th), and ends at 12 p.m. on the 7th November every year; and extends over nine townships, *viz.*, Prebend End, Gawcott, Lenborough, Bourton, Preston-cum-Cowley, Hillesley, Tingewick, Barton, and Chetwode. The payment is due on all cattle that travel on the drift in any part of it, or through the above townships (even from one field to another, if on the drift, but the farmers within the Rhyne usually compound by payment of a small sum, say 1s. per annum for their own stock), and the sum demandable is, on all beasts 6d. per head, sheep 5d. per head, and pigs 5d. per head. These sums are, however, now only demanded in some one instance every year to preserve the right, and the charge he takes in every other instance is 2s. per score, whether sheep, beast, or pigs. The plan of levying the Rhyne is this:—Boys are employed all over the Rhyne district, who, as it is called, Rhyne all the beasts, &c., they find on the drift by blowing a horn (or conch-shell, which they sling over their shoulders), then counting the number, and demanding the payment. Giles relates an instance in which a farmer and dealer refused to pay the Rhyne on some sheep passing through Gawcott, on which he had demanded about 15s. (at the rate of 2s. per score), that he went, on his refusal, to the then Steward of the Chetwode Court, who proceeded against the farmer, who had to pay the full demand and costs. The first thing each year Giles does is to get the boys together on Church Hill, Buckingham,—the church was formerly in Prebend End, —and at Finmere End, Tingewick, and give them gingerbread and ale; he then blows one of the shells, and cries, 'This is Sir John Chetwode's Rhyne Toll,' and then blows the shell again and begins the Rhyne. The object of this, he says, is that the boys may remember the Rhyne Toll, and that it is regularly kept up.

"We just mention that Browne Willis—the historian of Buckingham and its Hundred—states that the Lord of the Manor of Chetwode claims suit and service of the townships enumerated; but he says nothing about the Rhyne Toll, which is, however, traditionally held to have originated in a grant to one of your ancestors for slaying a Wild Boar which had ravaged those townships and destroyed their children.

We forward the box to-day by the L. & N. W. Railway, and we beg to remain,

"Sir George,

"Faithfully your obedient servants,

"Sir George Chetwode, Bart."

"Harrison and Son.

The existence of this toll may be traced to remote antiquity, but nothing is known of its origin except by local tradition. The

parish of Chetwode, as its name implies, was formerly thickly wooded; indeed it formed a part of an ancient forest, called Rookewood, which is supposed to have been conterminous with the present liberty of Chetwode. At a very early period it is said that this forest was infested with an enormous Wild Boar, which became the terror of the surrounding country. The inhabitants were never safe from his attacks; and strangers, who heard of his ferocity, were afraid to visit or pass through the district; so that traffic and friendly intercourse were seriously impeded, as well as much injury done to property, by this savage monster. The Lord of Chetwode, "a true and valiant knight," determined to rid his neighbours from this pest, or to die in the attempt. Bent on this generous purpose, he sallied forth into the forest, and, as the old song has it—

"Then he blowed a blast full north, south, east, and west—

Wind well thy horn, good hunter;

And the wild boar then heard him full in his den,

As he was a jovial hunter.

Then he made the best of his speed unto him—

Wind well thy horn, good hunter;

Swift flew the boar, with his tusks smeared with gore,

To Sir Ryalas, the jovial hunter.

Then the wild-boar, being so stout and so strong—

Wind well thy horn, good hunter;

Thrashed down the trees as he ramped him along,

To Sir Ryalas, the jovial hunter.

Then they fought four hours in a long summer day—

Wind well thy horn, good hunter;

Till the wild-boar fain would have got him away

From Sir Ryalas, the jovial hunter.

Then Sir Ryalas he drewed his broad sword with might—

Wind well thy horn, good hunter;

And he fairly cut the boar's head off quite,

For he was a jovial hunter.

Matters being thus settled, the neighbourhood rung with the praise of the gallant deed of the Lord of Chetwode, and the news thereof soon reached the ears of the King, who "liked him so well of the achievement" that he forthwith made the knight tenant *in capite*, and constituted his manor paramount of all the

manors within the limits and extent of the royal forest of Rookwoode. Moreover, he granted to him and to his heirs for ever, among other immunities and privileges, the full right and power to levy every year the Rhyne Toll, which has already been described.

Such is the story of the Chetwode tradition, which has descended unquestioned from time immemorial, and received, about forty years ago, an apparently singular confirmation. Within a mile of Chetwode Manor-house there existed a large mound, surrounded by a ditch, and bearing the name of the "Boar's Pond." It had long been overgrown with gorse and brushwood, when, about the year 1810, the tenant, to whose farm it belonged, wishing to bring it into cultivation, began to fill up the ditch by levelling the mound. Having lowered the latter about four feet, he found some bones, supposed to be those of an enormous boar. Probably this was the spot where it was killed, the earth around having been heaped over it so as to form the ditch and mound. The space formerly thus occupied can still be traced. It extends about thirty feet in length and eighteen in width, and the field containing it is yet called the "Boar's Head Field." The jaw and other portions of the skeleton are now in the possession of Sir George Chetwode, Bart., the present lord of the manor.*

There is a somewhat similar tradition at Boarstall, which stands within the limits of Bernewood Forest, as Chetwode does within those of Rookwoode.† These forests formerly adjoined, and formed a favourite hunting district of Edward the Confessor and his successors, who had a palace or hunting-lodge at Burghill (Brill), where the two forests met.

That the mere killing of a Boar should be so richly rewarded may appear incredible. But many a Wild Boar of old was so powerful and ferocious that he would attack a lion; while such was his stubborn courage that he would never yield till actually killed or disabled. The classic reader may here recall to mind the celebrated tale, in Greek mythology, of the Calydonian Boar that ravaged the fields of Ætolia, and was ultimately slain by

* A jaw-bone submitted to Prof. Flower was identified by him as that of a horse, and two large teeth proved to be molars of *Elephas primigenius*.

† This tradition, with some remarks on the former occurrence of the Wild Boar in Buckinghamshire, will be found in Harting's 'Extinct British Animals,' p. 80.

Meleager, with the help of Theseus, Jason, and other renowned heroes. Such, indeed, was the nature of the Wild Boar, that most of the early poets have chosen it as the fittest animal to illustrate the indomitable courage of their heroes; thus Homer:—

“Forth from the portals rushed the intrepid pair,
Opposed their breasts, and stood themselves the war.
So two wild-boars spring furious from their den,
Roused with the cries of dogs and voice of men;
On every side the crackling trees they tear,
And root the shrubs, and lay the forest bare;
They gnash their tusks, with fire their eyeballs roll,
Till some wide wound lets out their mighty soul.”

And Spenser, perhaps not without the charge of plagiarism, has the same illustration:—

“So long they fight, and fell revenge pursue,
That fainting, each themselves to breathe let,
And oft refreshed, battle oft renew,
As when two boars with rankling malice met.
Their gory sides fresh bleeding fiercely fret,
Till breathless both, themselves aside retire,
Where foaming wrath their cruel tusks they whet,
And trample the earth the while they may respire;
Then back to fight again, new breathed and entire.”

Such animals were most dangerous, not only to travellers and unarmed rustics, but to the hunting expeditions of the King and his nobles. It need not, therefore, surprise us to find that the destruction of a Wild Boar ranked, in the Middle Ages, among the deeds of chivalry, and won for a warrior almost as much renown as the slaying of an enemy in the open field. So dangerous, indeed, was the hunting of Wild Boars, even when the hunter was armed for the purpose, that Shakespeare represents Venus as dissuading Adonis from the practice:—

“O, be advised! Thou knowest not what it is
With javelin’s point a churlish swine to gore,
Whose tushes never-sheath’d, he whetteth still,
Like to a mortal butcher, bent to kill.
His brawny sides, with hairy bristles arm’d,
Are better proof than thy spear’s point can enter;
His short thick neck cannot be easily harm’d;
Being ireful, on the lion he will venture.”

Such hunting expeditions were generally fatal to some of the dogs, and occasionally to one or more of the hunters. Such was the case with Robert de Vere, ninth Earl of Oxford, who was killed in 1395 by the Boar he was pursuing.

The knight of Chetwode, then, who from benevolent motives encountered and slew the Boar that ravaged his neighbourhood, deserved to be richly rewarded; and what reward could be more appropriate than the privilege of claiming a yearly toll over those roads which he had thus rendered secure? Perhaps, too, the exacting of the toll for nine days was to commemorate the period during which the gallant knight persisted before he achieved his object.

Such customs as the Rhyne Toll are not without their uses. They are perpetual memorials, perhaps more convincing than written history, of the dangers which surrounded our ancestors, and from which our country has happily been so long delivered that we can now scarcely believe they ever existed."

In the opinion of sportsmen who have had experience in hunting the Wild Boar, whether in India (where "pig sticking" is a favourite amusement) or in other countries, no wild animal is harder to kill, being most tenacious of life, and offering a most stubborn resistance when brought to bay. The correctness of this assertion has been well illustrated by a well-known Indian sportsman, Capt. Shakespeare, in an account of a personal adventure with a Boar in India, which is so graphically written as to deserve quotation here:—

"While beating the sugar-canes (he says) for Wild Hogs, a few miles from Hingolu, a villager came and said, 'If you want to see a Hog, come with me'; and leading the way over the brow of a hill, pointed out an object in a field below, that in the mist of the morning appeared like a large blue rock, much too large for a Hog. However, the object presently got on its legs, and dissipated every doubt existing as to its character. About a hundred yards distant from the animal was a fissure in the hills, thickly wooded, and here, no doubt, was the Boar's lair; and if he took alarm and rushed thither, it would be next to impossible to dislodge him. A savage Boar in his stronghold is as difficult to oust as the Grizzly Bear from his winter cave in the Rocky Mountains. He constantly rushes out, knocks over and gores the beaters nearest the mouth of his retreat, and then skips back again before there is the shadow of a chance of spearing him."

After describing the way in which he managed to place himself between the Boar and his retreat, Capt. Shakespeare continues:—

“Standing as I was, behind a hedge considerably higher than my mare’s head, I did not see the Boar. The duffadar (native officer) was some thirty yards to my left, and, looking over a lower part of the hedge, shouted out, ‘Here he comes!’ The mare was standing still, and I had but just time to drop my spear-point, which caught the Boar in the rise, and the blade was buried in his withers. My mare, from her standing position, cleared with one bound the Boar, spear and all, as this was carried out of my hand; then suddenly turning, was in her stride after the Hog. The Hog had but seventy yards to reach the jungle, and just as he struck the first branch of the jungle with his back, breaking in two the shaft of my spear (which was still fast in his body), the duffadar closed with him. The Boar, having been missed by the spear, ran under the duffadar’s horse, and for thirty yards lifted him off his legs, plunging and kicking till the rider came to the ground. Fortunately we had three dogs with us; and having shouted to the people to let them go, they came up and took the attention of the Boar at the moment he was on the duffadar, who had fallen on his sword and broken it, and was utterly helpless. The next moment the Boar made full tilt for his stronghold, the dogs following close at his heels. Armed with a fresh spear, I rode up the face of the hill, and from thence, looking down, saw the Boar at bay and surrounded by the hounds, but in such a situation that it was impossible on horseback to go to the assistance of the dogs. At this moment one of the beaters came running up with a heavy double-barrelled rifle, and being apprehensive that the hounds would be speedily slaughtered if not relieved, I took the gun, and dismounting, resolved to attack the Boar on foot. Just as I got to the bottom, I saw the monster Boar with his back to a tree, and the three dogs looking very cautiously at him. He was about forty yards from me. Directly he saw me, putting his head down a little to take aim, he came straight at me, increasing his pace from the trot to the charge. When about fifteen yards off, he received the first bullet of my rifle in his neck. Taking not the least notice of it, he came on, and the second barrel fired at him, at about five yards, broke his left under jaw-bone at the tusk. Fortunately I brought my rifle down to the charge, and, striking it with his head, the Boar sent

me over on my back. While running over me he made a glance, and wounded me in the left arm. Had I not put down my rifle-barrel at the moment, most probably his tusks would have been buried in my body. As it was, I had two shooting-jackets on, it being a very cold morning, and I suffered more from the jar than the wound. As I lay, I seized the end of my rifle-barrel, determined to sell my life as dearly as possible. To my delight, I must say, I saw the Boar knock over the man who was running down with my big spear. He did not turn on either of us; for the Boar is a noble foe, rarely turning, unless desperately wounded and unable to go on, to mutilate a fallen enemy. The dogs immediately tackled him, and permitted me, though almost breathless, to get up. The rifle-stock was cracked, and the pin that fastens the barrel into the stock much bent. Having put this to rights, I loaded, and, proceeding in the direction the Boar had gone, came up to within fifteen yards of where he had halted and stood regarding me vengefully. Taking aim I sent a bullet through his eye into his brain, and rolled him over dead. I have stated that the Boar is the most courageous animal in the jungle. There he was; with a broken spear in his withers, the shaft sticking up a foot and a half from the blade; knocking over a horseman and wounding his horse; receiving two bullets,—ten to the pound,—the first in his neck and throat, the second breaking his jaw, and fired within a few feet of his muzzle; making good his charge, cutting down his enemy like grass, wounding him; knocking over a second man armed with a spear; defying the dogs; and then, in the act of charging again, shot in the brain, and dying without a groan."

WAYSIDE NOTES FROM THE CONTINENT.

By JOHN CORDEAUX.

WHEN running for Vlissingen Harbour, at the mouth of the West Schelde, on the morning of May 23rd, I noticed a large number of Terns beating for food. There must have been nearly two hundred, both the Common and the Arctic, but the former considerably in excess.

In Belgium bird-life appears as well represented as in our eastern counties, and although the carriage of an express train is not the most satisfactory position for identifying anything beyond

the most familiar species, yet it is surprising in the course of a long journey, and with the aid of a binocular, how much can be done; and at least it may be said the occupation secures one good purpose in whiling away the time, and adding also something of interest to an otherwise dull and uninteresting route. With the help of the glass I was able to make out many of our common home birds, and two new ones, the White and the Blue-headed Wagtail. Herons were especially numerous, either standing unconcernedly by the sides of the drains or flapping lazily across the swampy meadows. Cormorants not uncommon in the neighbourhood of the great estuaries; a few Sheldrake on the oozy flats; Curlews, and some smaller waders which looked very much like Knot. In the marshes Rooks, Starlings, and Lapwings were abundant.

At Wesel we are in another land, crossing the Rhine by an iron bridge with a strong *tête du pont*, where the blue-coated and brass-helmed sentinels of Prussia keep their ceaseless watch from the summit of big earthworks, and from grass-grown embrasures black muzzles of heavy guns protrude like crouching bulldogs sullenly guarding the frontier. The route from Wesel by Hanover to Berlin, excepting some small portions of Westphalia, is singularly uninteresting, vast level plains of a naturally poor and sterile soil, yet wherever capable the untiring energy and patient toil of the German peasant has raised them to the highest pitch of cultivation. Then there are vast tracks of pine-forest, where the trees are dwarfed and stunted, and much silver birch; but everywhere a scarcity of timber. Interminable stretches of brown heath, as level as a billiard-table, support the scantiest vegetation, where grey stones and sand crop out in bare patches.

I have frequently noticed how rarely during a long railway-journey on the Continent, compared with our own country, we see any game. In this long day of fifteen hours by rail I did not see a single Partridge, Pheasant, or Rabbit. Only some half-dozen Hares were feeding in the twilight on the outskirts of the corn strips, and two or three Deer in the forests.

On the sandy plains near Hanover I first noticed Crested Larks (*Haubenlerche*); they are readily distinguishable in flight, even at a considerable distance, by the light buff-brown of the outer tail-feathers, and the absence of any white.

On the afternoon of May 28th I spent some hours in the beautiful Palace Gardens at Charlottenburg, near Berlin. The bird most frequently seen perhaps was the Black Redstart (*Haus-Rothschwänzchen*), almost as familiar in its habits as our Redbreast, and having at a short distance much the character and look of that bird as it sits perched on some conspicuous place, a flower-stick, iron-fencing, or one of the ornamental vases so plentiful in German gardens. The Nightingale (*Nachtigall*) was also very numerous, and I heard five or six all singing at the same time; also the Garden Warbler (*Gartengrasmücke*) and Blackcap, but the former much more common. Every day I used to hear Nightingales singing within a hundred yards of the Brandenburg Gate.

I found the Black Redstart also numerous in the gardens of the villas on the heights south of Dresden overlooking the Elbe; indeed it appears to be everywhere far more plentiful than the Common Redstart (*Garten-Rothschwänzchen*). Of the latter I only saw a few, generally about the outskirts of the forests and open places in the woods. Very favourite haunts of the Black Redstart are outbuildings in gardens, and courts and stable-yards, where the walls are covered with roses, jasmine, and trailing masses of the Virginian creeper. I have frequently noticed the male bird on the summit of a vine-stake, hawking from this perch at the passing insects, and in these short flights displaying the strongly contrasting slate-grey and bright chestnut, which are his predominant colours. Seen thus, under an almost tropical sun, he seems essentially best fitted for warmth and sunshine, yet it is a curious fact that late in autumn many come westward to winter on our south-western coast, and, stranger still, appear to find a congenial home amongst the chill mists and drifting scud of the wave-worn skerries and isolated rocks on the Irish coasts (see 'Report on the Migration of Birds,' 1885, pp. 144-5).

Another common bird in the Dresden gardens is the Icterine Warbler (*Garten-Laubsänger*). When once heard it is impossible ever to mistake the song for that of any other of the small Warblers; it is composed of an extraordinary medley of notes, now its own and then imitative, expressed with the greatest energy, persistence, and power—a song full of melody, mixed, however, with notes that seem harsh, incongruous, and even grating. The

song, indeed, although especially powerful and attractive, is not to be compared with that of the Nightingale or Blackcap in compass, quality, or sweetness. It is as the mingled clash and wild melody of barbaric music compared with the polished strains and cultivated periods of civilisation—the finished opera singer and the gipsy with her tambourine. I agree with Mr. Seeböhm that “it has great power, wonderful variety, and considerable compass, but it is singularly deficient in melody” (*‘British Birds,’* vol. i., p. 382). In its habits it is bold and confident, and has little of the skulking, shelter-loving character of the leaf-warblers, preferring to sing in a conspicuous place, on the outer branch of an ornamental tree, or from the summit of a young cypress or fir. With a binocular I have watched it closely,—when under a brilliant sun the little creature for ten minutes at a time, with swollen throat and gaping beak (displaying the lemon-coloured fauces), has fairly quivered with the utterance of its own wild music,—astonished not a little that so small a bird should give forth notes which seemed more adapted to the powers of a Blackbird or Thrush. Gay little mocking-bird,—for justly art thou so called,—should ever I hear thy song again it will recall pleasant Pillnitz and its gardens, and the sunny vine-terraced slopes of the Saxon Elbe. The alarm-note is loud and discordant; it reminded me something of that of the Lesser Whitethroat, but is much louder and more expressive of anger and annoyance.

In the château gardens of Pillnitz I heard the four clear flute-like notes of the Golden Oriole (*Pirol*), but only once succeeded, after much patient watching, in seeing the bird as it flew from the top of one high tree to another; a beautiful and attractive object in contrasting black and bright gamboge-yellow.

In the same gardens, which are seven miles above Dresden, I saw the Spotted Flycatcher, Common and Lesser Whitethroats, Wood Wren, Garden Warbler, and Nightingale. The Lesser Whitethroat was particularly numerous; on one occasion I was a witness to the extreme solicitude of the female in trying to draw attention from its young brood, three or four little grey dots fresh from the nest, perched in the shrubs; down dashed the mother, fluttering at my feet in the most helpless manner, first dragging one wing and then the other along the pathway, nor did she cease

until I was led—willingly compliant to her little artifices—far from the objects of her solicitude.

I was a good deal puzzled, when at Dresden, by the notes of a small bird in the Grosser Garten; subsequently I heard the same little song at Pillnitz in a cherry-orchard, and soon saw the bird perched on an upper twig, which had shot up to some height above one of the fruit-trees; not more than four feet from where I stood was a rain-puddle in a rut, when, as I was wishing for a closer acquaintance, down flew the little songster and commenced drinking, and I was delighted to perceive it was a male Serin Finch. I was not then aware that the Serin Finch (*Girlitz*) has in recent years become common in that part of Saxony (see Mr. Seebohm's 'British Birds,' vol. ii., p. 84). Subsequently I saw one at Pillnitz, singing on the wing, and descending very much like a Tree Pipit on to the summit of a walnut-tree in a garden close to a dwelling-house. I heard and saw the Siskin (*Erlenseisig*) in the forest near Herrenskretchen, in Bohemia; also the Coal Tit and Nuthatch.

The Elbe-banks for some miles above and below Dresden offer very suitable haunts for various aquatic warblers. They are either fringed with willow-holts, or broken by backwaters, overgrown with reeds and dense scrub. There are also many pits of considerable extent and for miles in succession, from which I conjecture the earth has been taken at some time to raise the flood-banks. These places are choked with rank vegetation, alders and willows, with an undergrowth of sedges, rushes and brambles, and numerous pools of clear water overgrown with water-lilies and pond-weeds. These are just the sort of places we should expect to find swarming with the water-loving warblers. Yet the results of several hours spent in these localities were disappointing. Sedge Warblers seemed fairly common, but not nearly so generally distributed as in North Lincolnshire.

I saw one Aquatic Warbler, *Acrocephalus aquaticus*, attention being first attracted by its song, which struck me as differing from the Sedge Warbler's, the notes being not nearly so varied or the song so loud. With the glass I was also able to make out the light median stripe down the centre of the head. I cannot say if it is common, I should rather say not, as it was the only example I came across, and I spent many hours, in fact all one morning, in the search. The only other warbler seen was a

reddish-coloured bird, very shy and retiring, and particularly chary of its notes, which commenced at intervals, with much promise of a continuance, ceased as suddenly; it was so skulking that I never got my glass fairly upon it, and had to give it up at last; not reluctantly, as the closeness of the swamp was overpowering, the heat of the sun at noon having on that day been 85° in the shade. In this same place I noticed three young Blue-headed Wagtails sitting together on a dead branch over one of the pools, the old birds coming at times to feed them with insects. This Wagtail (*Gelbe Schafstelze*) seems not uncommon in the Elbe meadows and along the river. The White Wagtail (*Weisse Bachstelze*) extremely plentiful; I invariably saw a pair about the wooden landing-stages where the steamboats call to take in or discharge passengers and goods, also very often a pair or two on the long rafts of timber which are constantly passing down stream. Some ornithologists assert that the call-note of this species is distinguishable from that of our English Pied Wagtail, but I failed to perceive this. With regard to the songs of birds on the Continent, those of the Thrush and Blackbird struck me as decidedly varying from the same as heard in my own garden in England, and still more so those of the Chaffinch and Yellowhammer. In the Saxon Switzerland I noticed a pair of Grey Wagtails, *Motacilla melanope*, by the side of a small trout-stream; these were the only examples I saw in Germany.

I saw the Green Woodpecker twice near Dresden, and the Middle-spotted Woodpecker (*Picus medius*) in the pine-forest near Herrenskretchen. In various localities a few Buzzards and Kites; one Marsh Harrier beating over some swampy meadows on the Ilmenau, near Lüneburg. Of the smaller raptorial birds a few Kestrels and Sparrowhawks, and a Merlin; the latter on the sand-dunes near Dunkirk, in France, a locality which, from the great abundance of Wheatears, Whinchats, and other small birds, must be a happy hunting-ground for the small *Falconidæ*. These wide sea-dunes on the South Belgian and French coast would doubtless prove an excellent station for an ornithologist in the autumn, and yield a great many rarities when the stream of migrants, which we know follows the west coast of Europe, is passing southward. There is an abundance of shelter, such as small birds delight in, amongst the dense thickets of willow thorn, the grey-blue patches of sea-holly, and immense extent of

tall sea-grass (marram)—the same characteristic plants which we find growing on the Lincolnshire coast and the warrens of the Spurn, but on an infinitely more extended scale.

Black-headed Gulls are constantly beating to and fro on the Elbe, in Dresden, and also Terns, both the Common and Lesser. On one occasion I noticed a pair of the latter hovering above a pit opposite the new Rifle Barracks. At Pillnitz there is an island in the Elbe covered with tall trees and dense brushwood; at one end a bank of coarse gravel and shingle extends some distance into the stream, with here and there single willows and alder-bushes, and a few coarse plants. About ten pairs of Common and two pairs of the Lesser Tern frequented this spot, where they were evidently nesting; but I had no opportunity of verifying this by visiting the ground, as access is *verboten*, a very common and characteristic word in the Fatherland, to be met with at every turn. Just opposite the island the view from the road above the steamboat-landing is as fine as any in the neighbourhood, commanding the broad sweep of the Elbe through an undulating and highly-cultivated and luxuriant country, rich in corn and hop-gardens, and vineyards; the red tiles and white-washed walls of scattered villages and farmsteads contrasting with the silver-greys and cool greens of the landscape. In the middle distance, on a wooded hill more than eight hundred feet above the Elbe, stands the imposing fortress of Königstein; beyond this at varying distances the extraordinary geological formation of Saxon Switzerland, each hill rising abruptly like so many titanic rock castles, with precipitous flanks, high above the dark pine-forests stretching away in endless succession into Bohemia; to the south are the low rounded hills, the first spurs of the Erzgebirge: the faint outline of the higher range hardly visible, melting and mingling into the cobalt-blue of the furthest horizon.

The *Hirundinide* are all numerously represented on the Upper Elbe, and I do not recollect ever having seen so many Swifts as at Dresden. They career in great troops all day over the city, wheeling for hours around the lofty domes and towers of the chief buildings, and rush chasing and screaming with wild excitement beneath the arches of the old bridge which unites the two towns, careless of that ever-changing and ceaseless crowd of humanity passing to and fro in a double stream above. I never

crossed this bridge without a thought of a certain 26th of August, seventy-three years ago, when fair Dresden was girdled with a ring of fire, and contending nations piled the beautiful Grosser Garten with their dead and dying in desperate efforts to beat back the vanguard of Napoleon's army, which, to the number of 60,000, was unceasingly pushed across this grey old Augustus-brücke into the Altstadt through all the doubtful hours of that gigantic conflict.

Except in the low countries,—Holland and Belgium,—Rooks and Starlings are much less numerous than in England; to be accounted for, perhaps, by the absence of anything like extensive tracts of grass-land. The Grey Crow is common everywhere, and leads a life of unrestricted happiness, undisturbed by game-keepers or dreams of strychnined eggs; they nest everywhere in the woods and forests, and in the parks and public grounds, and are always to be seen in considerable numbers, foraging along the banks of the Elbe with all the boldness and familiarity of a favoured species. After seeing the Grey Crow in Germany, one may cease to wonder at the countless flights which cross the North Sea in October into our eastern counties.

Much credit is due in North Germany to all classes of the people for their uniform kindness and thoughtfulness where birds are concerned. I have seen a nest of half-fledged Black-birds continue undisturbed, and with the old birds feeding them, in a rose-tree close to a much-frequented thoroughfare, and fully exposed to every passer by. Under similar circumstances in England, the young would not have remained unmolested for five minutes.

On June 11th, when travelling from Dresden by Leipsig and Magdeburg to Hamburg, I noticed a Goshawk, several Buzzards, numerous Crested Larks and Turtle Doves, and more Partridges than I had seen in any other district in Germany. In the meadows near Hamburg, many Herons and two or three Storks. At a station where we remained some minutes I saw the Lesser Grey Shrike (*Lanius minor*) on the top of a six-foot pine growing on some waste land close to some houses. I had a very good look at this bird through the binocular, and had not the least doubt as to the species.

June 12th.—When off Cuxhaven this morning, twenty-seven Grey Geese passed, flying north. About noon the same day two

of the large white cabbage butterflies passed the steamer without attempting to alight, travelling from N.E. to S.W. We were then eighty-five miles W.N.W. of the Elbe mouth. About half-way over the North Sea I noticed four very large Gulls on the water right in our track; on nearing them they rose and flew off south; all four were Glaucous Gulls, two in adult plumage, the others mottled with pale brown. I was surprised to see these marine vultures so far south in the latitude of the Spurn at this time of the year.

June 20th.—Strong N. wind and heavy sea. When coasting between Dunkirk and Ostend to-day, we passed through immense numbers of the Common Scoter; more, indeed, than I have ever seen on any previous occasion and in any season in the North Sea; one flock alone probably contained from two to three thousand, another about half that number; besides these, many smaller flocks; they were continuously scattered along several miles of the North French and Belgian coast, and were particularly wild and wary, rising as a rule quite a quarter of a mile away, small groups only or solitary birds sometimes remaining till within long gunshot.

NOTES AND QUERIES.

The British Association.—The fifty-sixth annual meeting of the British Association for the Advancement of Science will commence on Wednesday, September 1st, 1886, under the Presidency of Sir William Dawson, C.M.G., F.R.S., &c. (Principal of M'Gill College, Montreal), who will take the place of Sir Lyon Playfair. The Vice-Presidents are the Earl of Bradford, Lord Leigh, Lord Norton, Lord Wrothesley, the Lord Bishop of Worcester, the Mayor of Birmingham (Mr. Thomas Martineau), Prof. Stokes, Prof. Tilden, the Rev. A. R. Vardy, M.A., and the Rev. H. W. Watson, F.R.S. The General Secretaries are Capt. Douglas Galton, C.B., F.R.S., and Mr. A. G. Vernon Harcourt, M.A., F.R.S.: Secretary, Mr. A. T. Atchison, M.A., and Local Hon. Secretaries, Messrs. H. W. Crosskey, J. B. Carslake, and C. J. Hart. The officers for Section D. *Biology*, are—President, Mr. W. Carruthers, F.R.S.; Vice-Presidents, Prof. Schaffer, F.R.S., and Mr. P. L. Selater, F.R.S., Sec.Z.S.; Secretaries, Prof. T. W. Bridge, M.A., Walter Heape (Recorder), Prof. W. Hillhouse,

M.A., Messrs. W. L. Slater, B.A., and H. Marshall Ward, M.A. We have been favoured by the Local Hon. Secretaries with an excellent programme (in pamphlet form) of the local arrangements, the object of which is to supply Members and Associates with information on all subjects specially connected with the meeting of the Association, which, judging from the list of lectures, exhibitions, field-meetings and garden parties already arranged promises to be a very enjoyable one.

Death of Mr. George Busk, F.R.S.—It is with much regret that we have to announce the death of Mr. George Busk, the well-known surgeon and naturalist, which took place in London on August 10th. As a Fellow of the Royal, Linnean, Zoological, and Microscopical Societies, and a contributor to their 'Transactions' and 'Proceedings,' Mr. Busk had a wide circle of acquaintance. At the College of Surgeons, of which learned body he was a Fellow, he had served on the Council and as President, besides filling for a time the chair of Hunterian Professor. Zoologists are indebted to him for translations of Steenstrup's work, 'On the Alternations of Generations,' and Kölliker's 'Manual of Histology.' As a *specialité* he worked chiefly at the Polyzoa, of which he published a British Museum catalogue, and (in 1884) an important monograph of the Polyzoa collected during the voyage of the 'Challenger.' As a palæontologist and anthropologist he was also very favourably known, having contributed several useful memoirs to the 'Proceedings' of Societies dealing with these subjects. His death, at the age of seventy-eight, will be deplored by a large circle of friends to whom his amiability and readiness at all times to impart information had deservedly endeared him.

Collecting in Marocco.—We hear that M. Henri Vaucher has taken up his quarters at Tangiers for the purpose of making zoological collections. Any one who may desire to secure specimens of the mammals, birds, reptiles, insects, or shells of Marocco will have now a good opportunity, and are invited to communicate with him direct. The address, M. Henri Vaucher, Tangiers, Marocco, will suffice.

MAMMALIA.

Albino Badgers.—It may interest some of your readers to know that I received on September 1st, 1885, two half-grown albinos of the Common Badger alive, from East Cornwall, where they had been dug out with their dam from an earth in a large wood on the banks of the Tamar, a few days before the above date. These beasts, which are still alive and well here, cannot be called white; their general colour is of a very pale sandy, the face-stripes of a somewhat darker shade than the other parts, and the eyes pink, or red-currant coloured. I have seen albinos of many of our

indigenous Mammalia, but never before met with this variety in the present species.—LILFORD (Lilford Hall, Oundle).

[White Badgers are occasionally reported, but are probably not very common. Records of the capture of individuals of this variety will be found in 'The Field' of 29th June, 1872; 'Zoologist,' 1872, p. 3180; 'Field,' 1st May, 1875; and 'Zoologist,' 1880, p. 252. On the 30th April, 1885, the terriers belonging to the Vine Kennels, at Overton, Hants, found and secured two dog Badgers in one hole, one of which was described to us as being "like a white Ferret with pink eyes."—ED.]

White Whale on the Coast of Devon.—Mr. J. C. Willcocks, a good authority on such matters, assured me that one day at the end of July he had a good view of a Beluga, or White Whale, *Delphinapterus leucas*, as it rose off the Bolt Head, close to the steam tug 'Perseverance,' in which vessel he was a passenger at the time.—J. GATCOMBE (55, Durnford Street, Stonehouse, Devon).

White-beaked Dolphin at Lowestoft.—On the 6th July last a friend of mine saw on the fish-wharf at Lowestoft a Cetacean which, from his description, was undoubtedly a White-beaked Dolphin, *Lagenorhynchus albirostris*. It was brought in by the Lowestoft boats, having been captured in their nets. From its size, about four feet in length, it was evidently immature; the sex was not observed. The fishermen spoke of it as a "Scoulter," and pointed out to my friend the features which distinguished it from a porpoise. I have stated elsewhere that this species is certainly known to the Yarmouth and Lowestoft fishermen by the name of "Scoulter," but whether any other species, as, for instance, *D. tursio*, is also so called, I am at present uncertain. The date of the capture of this individual corresponds with that of the Berwick specimen (1881), and is the earliest autumn record I have met with; the months of August and September having produced the greatest number. This is the twelfth occurrence of this species which has come to my knowledge on the coasts of Norfolk and Suffolk, but as in this and some other instances the identification of the species has been purely accidental, it is probable that others have been overlooked. It is a matter of regret that there is no resident naturalist in Lowestoft to record the many good things which must be doubtless often brought in by the fishing vessels of that port.—THOMAS SOUTHWELL (Norwich).

BIRDS.

Breeding of the Shoveller in Nottinghamshire.—About six years ago I noticed the first pair of Shovellers, *Anas clypeata*, on the waters here, and since then they have increased, until this year we have at least ten pairs nesting. During the last three years I have tried in vain to find

a nest. Last year I particularly wanted to get one, as Mr. Seebohm had no authenticated down for description in his work on British Birds. At last a keeper found a Shoveller Duck sitting, but, not wishing to disturb the nest, left her, and when I heard of it, she had hatched all the eggs. I at once sent the nest as it was to Mr. Seebohm, and he described the down in his work (vol. iii., p. 556). During the present summer we were determined, if possible, to get a nest, and on June 22nd Mrs. Whitaker found one in some mowing grass near the house. Strange to relate, the male bird was sitting on the eggs, which were three in number, smaller than those of the Wild Duck or Tufted Duck, of an oval shape and rich cream colouring. The nest was made of pulled grass mixed with down, which is grey with large white spots in the centre of each tuft. These eggs were the first authentic ones taken in this county. I am pleased to add that the Shovellers are now steadily increasing every year. They lay very late, no young ones being seen before the second week in June. The nest is always placed away from water, and they seem very fond of mowing grass. When the same field was cut we found another nest with a rotten egg in it. When these ducks pair in spring they may be seen chasing each other on the wing sometimes as long as ten minutes, the call-note sounding like "took-took." In flying the feet are held quite an inch above the tail, apparently to give a good balance, as the wings are very far back. The Shoveller keeps her young ones away from the ponds till quite grown up, and rears them in the water-carriers in the mowing meadows.—J. WHITAKER (Rainworth Lodge, Mansfield, Notts).

The Icterine Warbler.—I have read with interest the notes of your correspondents (pp. 333, 334) on the supposed Icterine Warblers. It may perhaps be useful to remark that in addition to the large size of this species, as compared with any other *Phylloscopus*, the colour of the breast of the living bird is of a peculiarly delicate yellow, which I have never seen in any other British form. Moreover, the tarsi and toes are of a uniform slate-grey. Both adults and nestlings are to be seen exposed for sale in the Paris Marché des Oiseaux.—H. A. MACPHERSON.

Rooks nesting on Chimney-tops.—When on a visit to Thurso in May last, I was surprised to see Rooks nesting on chimney-stacks of houses in that town. I was informed that some Rooks near there had nested on the ground on the side of a hill, the trees on which they had previously built having been destroyed.—L. H. IRBY (Wadenhoe, Oundle).

[Very few instances seem to have been recorded of Rooks departing, as above described, from their usual well-known nesting-habits. Two nests are said to have been built on housetops at Kingston-on-Hull in 1846 (Zool. p. 1366), and a pair of these birds, in 1869, attempted to build a nest on a stone head projecting under the eaves of Swaffham Church (Zool. 1869,

p. 1910), but the sticks and other materials used were constantly stolen by their companions, and they gave up the attempt.—ED.]

The Tree Sparrow in Skye.—After some years of unremitting search for the Tree Sparrow in Skye, I have at last discovered its presence at Uig, in the north of the island. Mr. J. J. Dalgleish was the first to note its appearance on the west coast at Ardnanmurchan, and since then the presence of the species in St. Kilda and Eigg has been vouched for by Mr. Charles Dixon, Mr. W. Evans, and myself; while Mr. Harvie Brown has also vigilantly followed the extension of its breeding range to a third insular locality, the fourth and last being the present Skye record. I visited the Eigg colony of Tree Sparrows again this year, and observed newly fledged young on July 15th, 1886. When Mr. Evans paid a flying visit to Eigg he overlooked the House Sparrow's presence in the island, not from want of energy, but because while the Eigg Tree Sparrow frequents the old walls about a farm-stead, the House Sparrow in this locality, perversely enough confines, itself entirely to a sea cliff, where it rests in the ivy, about a hundred and fifty yards from the Tree Sparrow's haunts. When visiting different parts of Skye this summer, I was much struck by the increase in House Sparrows, which are becoming very numerous. Possibly there are other colonies of the Tree Sparrow in the island, which will be discovered later on.—H. A. MACPHERSON (3, Kensington Gardens Square, W.)

Fearlessness of the Spotted Flycatcher.—As an instance of the fearlessness and confidence displayed by the Spotted Flycatcher (*M. grisola*) in the choice of public situation for the purpose of nidification, I may adduce the following as worthy of notice. This season a pair have built their nest in the most frequented situation at the Spa, Scarborough. The site chosen is upon a projection between the top of the door and the fan-light of the south-east tower of the building, and directly opposite the orchestra, the gilded finial of which forms a convenient post, whence they watch for their prey or perch a few moments before taking it to their young, when they are obliged to pass within a few feet of numbers of persons; occasionally they alight on the back of one of the chairs, during the performance of the band, without showing the least alarm. The birds attract no attention, and the nest has only been noticed by one or two of the attendants who have orders to protect it.—R. P. HARPER (2, Royal Crescent, Scarborough).

Blackcap and Grasshopper Warbler in Co. Mayo.—The first authentic instance of the Blackcap breeding in this western district has been discovered this summer by Miss Knox Gore, who on the 14th of May recognised the fine song of the male bird in her brother's demesne of Belleek Manor, and a few days afterwards, in a thicket close by, found the

nest with five eggs and the female hatching. Having frequently in the South of France seen and heard the Blackcap in full song, Miss Knox-Gore easily recognised its song and appearance beyond the possibility of mistake. The discovery of the Grasshopper Warbler visiting this district is also due to the observation of this lady, who met with the bird at Coolcronan, the demesne of Mr. E. H. Pery, situated on the banks of the River Moy, about four miles from Ballina. The Blackcap is a regular summer visitor, but very local in its habits, visiting but few districts in Ireland, chiefly in the eastern counties, and occasionally in the south. Thompson only mentions one instance of its occurrence in this province, and that was in winter, when an individual was shot near Tuam, Co. Galway, on the 1st November, 1842. Mr. A. G. More, in his List of Irish Birds, mentions it breeding in the counties Dublin, Wicklow, and Tipperary, and probably in Antrim also. It appears to be rather common about Fassaroe and the surrounding district in the Co. Wicklow a few miles beyond Bray.—ROBERT WARREN (Moyview Ballina, Co. Mayo.)

Iceland Falcon in Skye.—I had lately the pleasure of examining an Iceland Falcon, shot in Skye last March by my friend Captain McDonald, of Waternish. I understand that Mr. Macleay inadvertently recorded it in an Inverness paper as the Greenland bird, of which Captain McDonald shot a fine specimen two years before (Zool. 1884, p. 383). The recent bird is, as unquestionably, *islandicus*.—H. A. MACPHERSON (3, Kensington Gardens Square, W.)

Greyhen in plumage of Blackcock.—A female Black Grouse, *Tetrao tetrix*, was shot here, on August 20th, with elongated tail-feathers turned outwards in the form of a lyre, measuring about seven inches in length, as in the male. Can any naturalist inform me whether it is common to find the female Black Grouse in this plumage?—JAMES SARGENT (Nith Cottage, New Cumnock).

[The assumption of the male plumage by hen birds is a phenomenon well known to poultry breeders, and has been repeatedly noticed in the case of Pheasants. We believe that in all cases wherein dissection was made after death this curious condition was found to be correlated with disease of the ovaries.—ED.]

Breeding of the Forked-tailed Petrel on the Blasquets, Co. Kerry.—I have received a Petrel's egg, pure white, which from its size (1.27 by .94 in.) must belong to this species. It was taken on the Tearaght, a lofty rocky island, one of the outermost of the Blasquets, which lie off the Dingle Peninsula, Co. Kerry, and was taken there by the light-keeper, Mr. Ryan, on the 1st July last. He sent it to me with eggs of the Storm Petrel, which breeds numerously both on the Tearaght and other islands in the same group. Mr. Ryan merely remarked that one of

the Petrel's eggs was very large compared with any that he had seen. In 1878 Mr. Howard Saunders remarked to me that the Fork-tailed Petrel might be found nesting on the islands of Kerry, but this is, I believe, the first record of its breeding anywhere in Ireland.—R. J. USSHER (Cappagh, Co. Waterford).

[According to the latest information (Yarrell, 'Brit. Birds,' 4th ed. iv. pp. 38, 39):—"Along the shores of Ireland the occurrence of the Forked-tailed Petrel has been so general as to render special enumeration unnecessary; *but as yet it has not been found breeding there.*" In the next edition the lines italicised will have to be deleted. There is no doubt that the egg forwarded for our inspection by Mr. Ussher is that of *Thalassidroma leachii*. We have compared it with authentic specimens of the eggs of that bird in the British Museum collection, and find it to correspond precisely with them. Hitherto this Petrel has been known to breed with certainty in only two places in the British Islands, namely, on the Stack of Dun, at St. Kilda, where the late Sir William Milner procured eggs in 1847, and on the island of North Rona, where, in June, 1883, Mr. John Swinburne found it abundant. Mr. Seebohm, in his 'British Birds,' has figured the egg of this bird taken by Mr. Dixon at Doon, St. Kilda, in June, 1884. Capt. Elwes was informed by the natives that this bird breeds on Mingalay, and Mr. Robert Gray states that there is a colony on the island of Rum, but no confirmatory evidence of this has yet been obtained. Mr. Ussher is to be congratulated on being the first to establish the fact that it breeds on the Irish coast.—ED.]

Variation in size of the Water Rail.—The variation in the sizes of Water Rails, referred to by Mr. Aplin (p. 338), is certainly striking. I first noticed it some years ago. I have four sterna of this bird. Two, shot respectively at Saddlescombe, Sussex, on December 21st, 1878, and at Chelmsford in 1879, measure almost exactly 1·25 in. Two others, shot respectively near Easingwold, Yorkshire, in November, 1877, and near York, in the same month, measure 1·38 in., a variation much less than that noted by Mr. Aplin, though still considerable. These measurements are from the anterior extremity of the keel to the hinder margin in a straight line. In no case was the sex noted. I have also stuffed specimens, one of which, shot here by myself on December 8th, 1879, the day after the great frost, is a monstrous one by comparison with others. I regret now that I omitted to take the dimensions while in the flesh.—R. MILLER CHRISTY (Chignal St. James, Chelmsford).

Three Cuckoos' Eggs in a Titlark's Nest.—A friend, who is fond of everything connected with country life, found three Cuckoos' eggs this summer in a Titlark's nest, and took all three. Is this not a very unusual circumstance? This friend lives in a very wild moorland district, just the

place for Cuckoos ; in fact, they abound there. I wonder what would have happened if the Titlark had hatched all three. I suppose there would have been a "fight for the championship," as I conclude the Titlark could not possibly have reared more than one. Every year a pair of Wagtails bring up a Cuckoo in my garden, and I notice that it is as much as they can do to manage to get food for it. I am sure they could not provide for a couple. —REGINALD KELLY (Lifton, N. Devon).

[Our correspondent does not state whether the Cuckoos' eggs in question were all of the same colour and pattern. They may have been laid by different birds ; but, having been deposited at intervals, the young Cuckoo hatched from the one first laid would doubtless have asserted its superiority. —ED.]

Redwing nesting in Kent.—A nest of this bird has been found at Cranbrook, Kent. Of the identity of the species I am quite sure, for the bird was killed on the nest, and proved to be a Redwing. — A. KENNARD (18, Wood Street, Cheapside).

Lesser Terns breeding on the Keraghs, Co. Wexford.—On the 8th June last I visited the Keragh Islands with the Rev. W. W. Flemyng and Mr. J. N. White. We found the numbers of Common and Arctic Terns breeding on the western island greatly increased since I visited it in 1883. On the north side of the eastern island we found a small colony of Lesser Terns, and took five clutches of their eggs, some uncompleted, others much incubated. They were among the sand, shingle, and seed-weed, close to high-water mark. This is the first instance in which I have met with the Lesser Tern breeding in the South of Ireland, though it breeds in the Co. Wicklow and on several other parts of the coast. Though I visited the Saltees on the above date, I have no other addition to make to my notes of the birds of that locality, which appeared in 'The Zoologist' for March last (p. 88).—R. J. USSHER (Cappagh, Co. Waterford).

Late retention of Winter Plumage in the Guillemot.—When steaming off Oban on the 25th June last we were interested to observe, in a small party of *Uria troile*, a single example which was still in perfect winter plumage, its white foreneck contrasting strongly with the dark livery of its companions.—H. A. MACPHERSON (3, Kensington Gardens Sq., W.).

Barn Owl nesting in a Dovecote.—It may interest you to know that a Barn Owl has taken up her abode in my dovecote for the last three months. The Pigeons do not mind her. She sits during the day in one of the holes, and always comes out every evening, and invariably takes the same route. I hoped she had nested, and went up to-day (June 29th) to look, but found no nest. She took no notice of me. I fear she is the last of her species in these parts, as I have not seen one for a long time. We have Brown Owls, but the Barn Owl is, I fear, become nearly extinct.

My dovecote is one of the old-fashioned buildings with an entrance at the top down into a room with holes in the walls all round. Since writing the above a month ago, I found yesterday (July 26th) a couple of young Owls in the dovecote. I am very glad of it, as it proves there is a pair of old Owls about, although I never see more than one at a time. — REGINALD KELLY (Lifton, N. Devon).

[This confirms the view long ago expressed by Charles Waterton, in his 'Essays on Natural History,' first series (p. 14). He says:—"When farmers complain that the Barn Owl destroys the eggs of their Pigeons, they lay the saddle on the wrong horse. They ought to put it on the Rat. Formerly I could get very few young Pigeons till the Rats were excluded effectually from the dovecot. Since that took place it has produced a great abundance every year, though the Barn Owls frequent it, and are encouraged all around it. The Barn Owl merely resorts to it for repose and concealment. If it were really an enemy to the dovecot we should see the Pigeons in commotion as soon as it begins its evening flight! but the Pigeons heed it not: whereas, if the Sparrowhawk or Hobby should make its appearance, the whole community would be up at once; proof sufficient that the Barn Owl is not looked upon as a bad, or even suspicious, character by the inhabitants of the dovecot."—ED.]

Black Guillemot breeding in Co. Waterford.—On the 2nd June last I took, for the first time, two eggs of the Black Guillemot on a rocky part of this coast. I subsequently received another clutch of two eggs of the same species, taken on May 29th on another part of the coast. Both clutches were in an early stage of incubation. A third clutch was reported to have been taken about the same time. I have heard of Black Guillemots breeding in Co. Waterford for many years, but have not had an opportunity of verifying the statement until this year. These birds are not numerous, so far as I know, on any part of the Irish coast, but I have seen them in Co. Kerry.—R. J. USSHER (Cappagh, Co. Waterford).

Sparrowhawks' Eggs.—This summer, near Beckenham, Kent, I found a Sparrowhawk's nest in a fir tree, containing no less than eight eggs. The nest apparently was not an appropriated one, as is often the case, but built by the hawk. It was composed of sticks and lined with a few oak leaves. The number of eggs laid is sufficiently unusual, I think, to be mentioned in 'The Zoologist.'—A. KENNARD (18, Wood Street, Cheapside).

REPTILES.

Viper swallowing its Young.—The following facts may be worth publication, as corroborating Mr. J. C. Mansel-Pleydell's notice in last month's 'Zoologist' (p. 340). A labouring man described accurately to me last month, in the New Forest, the fact of his having surprised and

killed a Viper, which "he saw swallow five or six things that looked like worms," before he was near enough to strike at it. He killed it by hitting it on the head with a stick he was carrying, and then made steady pressure on the body of the reptile with his boot, when he saw seven young Vipers wriggle out of the mother's mouth in quick succession. He described them as being "vicious little things, that all showed fight," and the size of them as being approximately "the thickness of whipcord," and several inches in length.—PERCY RENDALL (20, Ladbroke Square, W.).

FISHES.

Ray's Bream at Penzance.—I have to record the capture of a fine specimen of Ray's Bream. It was taken in a pool about six feet deep artificially formed in the course of the building of a pier at Newlyn in this bay. The masons had finished the concrete wall, and were pumping out the water, when the fish was seen swimming about, and on being captured by a boat-hook run through the eye, was then brought direct to me. It is the first I have seen with all its scales on, and it is a much more silvery fish than the specimen coloured by Couch (1st ed., vol. ii., p. 129), but Day (vol. i., p. 115) mentions that its colours "appear subject to considerable variation." When first seen it was swimming with activity and speed, and as I had already received some five or six specimens (and indeed eaten one), I determined to have this one cooked. The stomach was quite empty, and the intestines very short. The flesh proved firm and white, not flaky, and of excellent flavour. This is, I believe, the first specimen observed alive and well. All the other recorded specimens, except one, have been taken on the beach in a dead or dying condition after storms. The exception is a case in which Mr. Couch, in 1828, had brought to him a specimen taken on a line (see Yarrell, 1st ed., vol. i., 120; Couch, 1st ed., vol. ii., 129), but the method of capture is mentioned with particular vagueness.—THOMAS CORNISH (Penzance).

STELLERIDA.

Rare Star Fish off Aberdeen.—In 'The Zoologist' for 1882 (p. 24) I had the pleasure of recording the occurrence off Aberdeen of that rare and elegant Ophinorid *Asteronyx Lovéni*, Mull. and Fr. I have now to report the occurrence of a second example, taken in the same locality. Indeed, on this occasion two specimens were taken, but one of them having got broken into several pieces, it was cast overboard by the fishermen as worthless.—GEORGE LINN (14, King Street, Aberdeen).

SCIENTIFIC SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

August 4, 1886.—Prof. J. O. WESTWOOD, M.A., F.L.S., Hon. Life President, in the chair.

The following gentlemen were elected Fellows, *viz.*:—Lord Dormer, Mr. J. H. A. Jenner, Mr. James Edwards, Mr. Morris Young, Mr. F. V. Theobald, Mr. E. A. Atmore, and Mr. William Saunders, President of the Entomological Society of Ontario.

Mr. Theodore Wood exhibited and made remarks on the following Coleoptera, *viz.*:—An abnormal specimen of *Apion pallipes*, with a tooth upon the right posterior femur; a series of *Langelandia anophthalmi* from St. Peter's, Kent, taken in decaying seed potatoes; a series of *Adelops Wollastoni* (Janson), and *Anommatus 12-striatus*, also from decaying seed potatoes; and a series of *Barypeithes pellucidus* (Boh.), from the sea-shore near Margate. Mr. Wood also exhibited, on behalf of Dr. Ellis, of Liverpool, a specimen of *Apion annulipes* (Wenck).

Prof. Westwood exhibited five specimens of a species of *Culex*, supposed to be either *C. cantans* or *C. lateralis*, sent to him by Mr. Douglas, who had received them from the Kent Water Works. It was stated that they had been very numerous in July last, and that persons bitten by them had suffered from "terrible swellings." Prof. Westwood also exhibited some galls found inside an acorn at Cannes in January last.

Mr. Billups exhibited a male and female of *Cleptes nitidula* (Latr.), taken together in July last, at Benfleet, Essex, on the flowers of *Heracleum sphondylium*. He stated that it was probably the rarest of the twenty-two known species of British *Chrysididæ*, though it had been recorded from the New Forest and from Suffolk. Prof. Westwood, the Rev. W. W. Fowler, Mr. Fitch, and Mr. Champion, made some remarks on the species.

The Rev. W. W. Fowler announced that a series of specimens of *Homalium rugulipenne* (Rye) had been received from Dr. Ellis, of Liverpool, for distribution amongst members of the Society.

Mr. White exhibited a group of three specimens of *Lucanus cervus*, consisting of a female and two males. The female was pairing with one of the males, which, while so engaged, was attacked by the second male.

Mr. E. A. Fitch read a paper, communicated by Mr. G. Bowdler Buckton, "On the occurrence in Britain of some undescribed *Aphides*." The paper was illustrated by coloured drawings.

Prof. Westwood read a paper "On a tube-making homopterous insect from Ceylon."

Mr. Theodore Wood read a paper "On *Bruchus* infested Beans." A discussion ensued, in which Prof. Westwood, the Rev. W. W. Fowler, Messrs. Weir, Fitch, Trimen, and others took part.—H. Goss, *Secretary*.

NOTICES OF NEW BOOKS.

The First Report upon the Fauna of Liverpool Bay and the Neighbouring Seas. Written by the Members of the Liverpool Marine Biology Committee, and edited by W. A. HERDMAN, D.Sc., F.L.S., Professor of Natural History in University College, Liverpool. With ten plates and two maps. London: Longmans, Green & Co. 1886.

IN the spring of 1885 Professor Herdman, of University College, Liverpool, who is so well known to Zoologists on account of his researches on the anatomy of Ascidians and on Marine Zoology generally, but more especially for his laborious 'Challenger' reports on the *Tunicata*, called together a number of local naturalists to formulate a scheme for the investigation of the fauna and flora of the neighbouring seas.

The "Liverpool Marine Biology Committee" was then constituted, and it was decided "that steps should be taken to investigate the Marine Biology of Liverpool Bay during the coming summer, with the view of compiling a 'Fauna' of the neighbourhood." Arrangements were made for "(1) organizing dredging, tow-netting, and other collecting expeditions; (2), the examination and description of the specimens obtained; and (3), the publication of the results."

A well got-up 8vo volume of 372 pp., 10 plates and 2 maps, is one result of this enterprise. This is highly creditable and encouraging, and illustrates what may be accomplished by energy and enthusiasm. The Committee was a strong one, and the Editor has been seconded by able colleagues, while the fiscal support likewise was apparently sufficient.

It would be well if local societies would take a lesson from Liverpool, and endeavour by systematic work to publish complete local faunas and floras. This has been done, and well done, for some counties and for some subjects; but Marine Zoology, as a whole, has been woefully neglected. There must be a large number of scattered workers; what is needed is that their individual efforts should be systematised, and that something definite should be aimed at. This is pre-eminently a

matter for the consideration of the secretaries of field-clubs and other natural history societies. Doubtless, as in the case of the Liverpool Committee, offers of assistance in the form of lending suitable vessels for dredging, or in other ways, would be made by outsiders.

In addition to the detailed reports of groups by various naturalists, there is a paper on "Pioneers in Local Biology," by the Rev. H. H. Higgins, M.A.; an essay by Prof. A. M. Marshall, F.R.S., "On Shallow-water Faunas"; "Notes on some of the *Polychæta*," by R. J. Harvey Gibson; "Notes on Variation in the *Tunicata*," by Prof. Herdman; "On a New Species of *Sycandra*," by R. J. Harvey Gibson, &c.

The Editor writes:—"In order to render this Fauna of Liverpool Bay as nearly complete as possible, the species recorded by the previous investigators have been discussed along with those actually collected by the Committee. Consequently, most of the reports may be regarded as including records of all the work done upon the particular groups of animals in this district, brought up to date."

The numerical results of the year's work are the addition of 235 species new to the district, making a total of 913 species. Sixteen of these species have not been previously discovered in the British seas, and at least seven species and three varieties are new to science.

The following are new:—Foraminifera: *Miliolina spiculifera*, p. 51, pl. i., fig. 3. *Reophax moniliforme*, p. 54, pl. i., fig. 2. *Placopsilina kingsleyi*, p. 54, pl. i., fig. 1. (None of these are properly described by Mr. J. D. Siddall). Porifera: *Aphroceras ramosa*, n. sp. (H. J. Carter), p. 92 (no figure). *Sycandra aspera*, n. sp. (Harvey Gibson), p. 365, pl. x., figs. 1—7. (There is a want of definite character about this species). Actiniæ: *Cylista undata*, Müll., var. *candida*, n. v. (J. W. Ellis), p. 126, pl. ii., figs. 3, 4. Polyzoa: *Eucratea chelata*, Linn., var. *gracilis*, n. v. (J. Lomas), p. 165, pl. ii., fig. 1. *Pedicellina gracilis*, Sars., var. *nodosa*, n. v. (J. Lomas), p. 190, pl. iii., fig. 2. Tunicata: *Polycyclus savignyi*, n. n. for *Botryllus polycyclus*, Sav., p. 283. *Morchellioides alderi*, n. sp., p. 291, pl. vi., figs. 1—4. *Polycarpa monensis*, n. sp., p. 305, pl. i., figs. 1—8 (all of Herdman).

Mr. Siddall alone compares his record (Foraminifera) with published lists from the other side of the Irish Sea, but

patriotism in his case has somewhat overruled judicial impartiality, as a few instances will show. *Haliphysema tumano-wiczii*, previously recorded from Dublin, in Balkwill and Wright's Report (Tr. R. Irish Ac. 1885, p. 354), and in Brady's 'Challenger' Report, ix., p. 281. *Reophax moniliforme*, n. sp., was described and figured, but not named by Balkwill and Wright, who also found *Lagena lyellii* (p. 338), and *L. lucida* (p. 340), at Dublin.

The book appears to be particularly free from misprints or oversights, but in bringing out a second volume, greater care should be taken with the plates; most of the figures are coarse and indistinct, while one or two are practically unrecognisable.

Catalogue of the Birds in the British Museum. Vol. XI. The Passeriformes or Perching Birds (Fam. *Cœrebidæ*, *Tanagridæ* and *Icteridæ*). By PHILIP LUTLEY SCLATER. 8vo, pp. 431. With 18 coloured plates. London: Printed by order of the Trustees. 1886.

THE large and important additions which have been made to the National Collection of Birds, by the acquisition of three valuable private collections within the past two years (*cf.* Zool. 1885, pp. 343, 355), will only be gradually appreciated by ornithologists at home and abroad, as these fresh materials for the General Catalogue now in progress come to be utilised in each succeeding volume. Some idea of the present dimensions of the general collection may be formed, when it is stated that, although the volume of the Catalogue just completed by Mr. Sclater deals with only three families of Passeriform birds restricted to the New World, the total number of species included is 575, represented in the British Museum Collection by 5494 specimens. In most cases there is a good series of each, serving admirably to show the geographical distribution of the species, and the changes of plumage which are referable to age, sex, and season.

The three families dealt with in the volume just published, are especially characteristic of the Neotropical Region, and it is fortunate that the collections of Messrs. Salvin and Godman, and of Mr. Sclater, so rich in South American species, have been acquired so opportunely as to admit of their partial incorporation in the new volume of the Catalogue.

In regard to classification, Mr. Selater considers the *Cœrebidæ* to be nearly allied to the *Tanagridæ*, and indeed it is somewhat difficult to separate them by external characters. They appear, he says, to perform the same functions in Nature in the Neotropical Region as the *Nectariniidæ* and *Dicæidæ* in the tropics of the Old World. The *Tanagridæ* also are very closely allied to the *Fringillidæ*, and are in fact fruit- and insect-eating finches. They come in very naturally, he considers, between the *Mniotiltidæ* and *Cœrebidæ* on the one side, and the *Fringillidæ* on the other. But whether the *Icteridæ* should immediately follow the *Tanagridæ* in a natural series, is perhaps open to question. They present many points of resemblance to the *Sturnidæ*, and it might be better therefore to place them after *Fringillidæ*, and in the immediate neighbourhood of the former family. Mr. Selater, however, has deemed it advisable to follow Mr. Wallace's arrangement of the Oscines, which has been adopted in this part of the Museum Catalogue.

The eighteen coloured plates (drawn by Smit and lithographed by Mintern Brothers) will show to the uninitiated what very beautifully plumaged birds are included amongst the families comprised in this volume. Of the species figured the following are unique:—*Chlorophanes purpurascens* (pl. iv.), *Chlorophonia flavirostris* (pl. vi.), *Euphonia vittata* (pl. x.), and *Arremon wuchereri* (pl. xvii), while several others, such as *Buarremon leucopis* (pl. xiv.), *B. comptus* (pl. xv.), and *Icterus hawxwelli* (pl. xviii.), have been figured from the type specimens in the British Museum Collection, the last-named having been described for the first time by Mr. Selater only last year (Proc. Zool. Soc. 1885, p. 671). Among the very few typographical errors which we have noticed in this volume, we may point out a want of correspondence in the specific name of a *Certhiola* described on p. 46, and figured on plate v., a trifling mistake which is easily corrected.

Catalogue of the Lizards in the British Museum. Second Edition.

By G. A. BOULENGER. Vol. II. 8vo, pp. 492, with 24 plates. Printed by order of the Trustees. 1885.

WHEN reviewing the first volume of this new edition of the Catalogue of Lizards ('Zoologist,' 1885, p. 196), we did not

expect that the second volume would be so soon forthcoming. With the enthusiasm of a specialist, however, Mr. Boulenger has worked so indefatigably at its preparation that it has been possible to issue both in the same year, and, but for the limited space at our disposal for reviews, Vol. II. would have received an earlier notice. It deals chiefly with the Lizards of the New World, and, as in the case of the American birds above noticed, its importance has been enhanced by the valuable accessions derived from the collection of Messrs. Salvin and Godman, and the United States National Museum. Some idea of the labour entailed in its preparation may be formed from the fact that it has necessitated the description with the synonymy of no less than 561 species, of which 375 are in the British Museum, represented by 2335 specimens.

So far as it is possible to represent a species without the aid of colour, the four-and-twenty plates in this volume, drawn by Mr. P. Smit, seem to be very carefully and accurately done. Some of them, as, for example, *Stenocercus torquatus* (pl. viii.) or *Biocephalus aculeatus* (pl. xi.), could perhaps hardly be improved, except by the addition of the natural colours, which in some cases are very bright and beautiful.

It is to be regretted that no method has yet been discovered of preserving or restoring the natural colours of reptiles (and, it may be added, of fishes). As soon as the stuffed specimens are thoroughly dried their beauty is as thoroughly destroyed, while those which are preserved in spirit scarcely convey any better idea of their natural appearance. It is for this reason, we presume, that no attempt has been made to give coloured representations in this volume of the species which it has been thought desirable to figure. The facilities, however, which are now afforded for the transport of living specimens, and the favourable conditions under which Reptiles and Batrachians may now be kept alive and studied in the new Reptile House at the Zoological Society's Gardens, lead us to hope that no opportunity will be lost of securing the correct delineation in colours of such obtainable species as have not been hitherto depicted. Of the numerous works which have been published relating to the Reptilia, it is remarkable how few there are which contain really accurate and recognisable figures of the species which the authors profess to describe.

British Birds' Eggs: a Handbook of British Oology. By A. G. BUTLER, F.L.S., F.Z.S. Parts I.—III. 8vo. London: E. W. Janson. 1886.

JUDGING by the many unsuccessful attempts which have been made to give accurately coloured representations of birds' eggs, the conclusion is forced upon us that no natural objects can be more difficult to delineate. The following English authors' names occur to us in connection with the subject: Adams, Atkinson, Bree, Hewitson, Jennings, Laishley, Meyer, Morris, Newton, and Seebohm; and yet of all these not more than three can be said to have produced coloured plates of eggs which are so accurate as to be capable of identification without recourse to the letterpress (for this after all is the test of excellence), and none of them, in our opinion, are comparable to Baedeker, whose work, '*Die Eier der Europäischen Vögel*,' published a quarter of a century ago, has in point of illustration never been excelled.

In view of the recently published work of Mr. Seebohm, which in the case of most of the larger eggs contains figures more accurately coloured than those in Hewitson's work, it was a bold step on the part of Mr. Butler to bring out another "egg-book" so soon; for, while he could hardly expect in the letterpress to add anything to the information already supplied by so experienced a collector as Mr. Seebohm, it would be extremely difficult, in the present state of lithography in England, to improve upon that author's plates. His incompetency, indeed, for such a task he has himself frankly admitted. In his Introduction (p. vii), he says:—"Nearly the whole of my collecting having been done in Kent [!], and for the most part inland, there was little opportunity either of collecting eggs of many of the larger birds, or learning anything by personal experience respecting their nidification; it therefore became necessary to draw largely upon the experience of many excellent observers whose ornithological works were at my disposal."

How far he has succeeded will be best judged by those who are familiar with the work of his immediate predecessor in the same line. We will not make minute comparisons, but candour compels us to say that so far as his work has progressed (three parts are before us as we write) hardly one of the plates can be considered satisfactory, and some of the figures are undoubted failures. We must admit, however, that the plates in Part III.

show a decided improvement upon those in the preceding Parts, the eggs of the *Corvidæ*, for example, and some of the *Fringillidæ*, being fairly good.

We imagine that Mr. Butler's prime object in producing this work is based upon a conviction that a trustworthy manual of British Oology, cheaper than the large works from which he has drawn, would find considerable favour. In this we are inclined to agree with him, and for his sake we hope there may be many who will willingly pay thirty shillings. We feel compelled, however, to say that as yet many of his figures do not compare even favourably with those in Laishley's 'British Birds' Eggs,' published, if we mistake not, at a third of the price.

Not more than a page, as a rule, is devoted to each species headed by the English and Latin names, with a reference to plates and figures. Brief notes follow on the geographical distribution, food, nest and position of nest, number of eggs and time of nidification; the remainder of the page being occupied with what may be termed "general observations." Some of these are remarkable, we are sorry to say, for their inaccuracy. To give an instance: alluding to the Wryneck, Mr. Butler says (p. 112), "Its cry is a sharp whistle, supposed to represent the word *jynx*, whence its generic name." The name of the author who hazarded such an extraordinary supposition is not given, and it is due to the great authority on derivation (who has made this subject peculiarly his own) to state that Mr. Butler's words do not accurately represent *his* views on the question (see 'The Ibis List of British Birds,' p. 80). Knowing Mr. Butler's partiality for a joke, we should be almost inclined to suspect him of playing "high jinks" with his readers. It is perhaps fortunate for them that he does not describe the *young* as well as the *egg* of each species in his book; otherwise we might expect to find him characterising the young Wryneck as "*Jynx's* baby."

The Book of Duck Decoys: their Construction, Management, and History. By Sir RALPH PAYNE GALLWEY, Bart. 4to, pp. 214. With numerous coloured plates and wood engravings. London: Van Voorst. 1886.

In this handsomely got up volume a subject of much interest to naturalists and sportsmen has been, for the first time,

exhaustively treated. The personal experience gained by the author in the construction and management of a decoy of his own, as well as the inspection of others, has enabled him to give not only an accurate description of the way in which wild-fowl decoys are worked, but careful details and plans which will be very useful to any one who may care to follow out his instructions for making one.

Many persons seem to be of opinion that decoys in England are amongst things of the past, but, so far from this being the case, there are at the present time about forty still in use in different parts of the country; while as many as one hundred and forty others are known to have formerly existed. The counties in which the greatest number of decoys were to be found are, as might be expected from their proximity to the sea, Essex (29), Lincolnshire (39), and Norfolk (26). For the fourth place Somersetshire vies with Yorkshire, each having at one time possessed fourteen. In Ireland there are very few; in Scotland none.

The drainage of the fens, the reclamation and cultivation of waste lands, the formation of railways, and the great increase in the number of shooters have each and all contributed to ruin decoys. Moreover, the large numbers of wildfowl which are brought by steamer and rail from Holland and other parts of the Continent every winter render it less than ever necessary for the owners of decoys in this country to incur the expense of maintaining them. Again, in counties where game abounds, and is strictly preserved for the purpose of being killed by large shooting parties during the winter months, "decoying" is out of the question unless absolute quiet is allowed to prevail within sight and sound of the decoy pond, for otherwise no ducks will visit it, or remain to be caught.

So far as can be judged from imperfect descriptions, the form of decoy introduced into England, it is said by Sir William Wodehouse, in the reign of James I., was probably much the same as that used at the present day, allowing for such modifications and improvements as time would be likely to develop. Most writers who have referred to the subject agree in attributing the invention to the Dutch, the word "decoy" being, it is said, a corruption or abbreviation of the Dutch *cende-kooi*, i. e., duck-cage.

The early history of decoys in England is still involved in some obscurity, which even Sir Ralph Gallwey's indefatigable research has not entirely removed. There are probably many earlier notices of decoys in England than those which he has quoted, commencing with an entry in Evelyn's 'Diary,' dated March 29th, 1665, which refers to a decoy then being finished by Charles II. in St. James's Park; for, if Sir Henry Spelman was correct in stating, in 1641, that Sir William Wodehouse, in the reign of James I., was the first maker of a decoy in England, one would suppose that many allusions to, if not descriptions of, the invention would have found their way into print long before Evelyn penned the note in his 'Diary' in 1665.

We may mention one work which seems to have escaped the notice of Sir Ralph Gallwey, and which is worth quoting because it contains the positive statement that there were *many* decoys in the maritime counties of England before 1675, the date of its publication. It is entitled 'Systema Agriculturæ, being the Mystery of Husbandry discovered and layd open by J. W.' [John Worlidge.] The first edition, which appeared in 1669, does not contain the Chapter (XII.) of "Fowling and Fishing," which was added in the second edition published in 1675, and in which the following remarks occur:—

"A short digression concerning Decoy Ponds.—Falling into this discourse concerning Waterfowl, I cannot omit to give you some encouragement to prosecute this most ingrossing way of taking them by Decoys; that which unless seen or known may seem incredible, how a few subtil Fowl should be able to draw, decoy, or trapan such multitudes of their own kinde into a known snare, and there leave them to their unfortunate ends; such unnaturalness being not to be paralleled in any other creature whatsoever. They are a peculiar species of that kinde of Fowl, and are from the egg trained up to come to hand. The manner of doing it and the making of the Pond, and the several apartments belonging unto it requires a skilful Artist, and not book directions.

"That they are of considerable advantage, is not to be doubted, *there being many of them erected in the maritime parts of this kingdom*, the gain whereof is from the vast numbers of them taken in the winter time, which are supplied from the more northern regions, whence the frost, ice, and snow banish them into the more southern. The decoys flying abroad, light into their company, and soon become acquainted with them, and allure them being strangers; and they willing to follow them in hopes of good

quarters, are by these decoys brought into the very place, where they become a sufficient reward to the owner of the Decoy, and a great supply to the adjacent markets " (p. 243).

At page 9 of Sir Ralph Gallwey's book we find a facsimile engraving borrowed from an old edition of the 'Fables of Æsop,' by John Ogilby, printed in 1665. It represents a decoy-man in the foreground taking fowl out of a tunnel net, with a pool of water in the middle distance, the mouths of two pipes showing beyond, and ducks on the wing as well as on the water. "This," says Sir Ralph Gallwey, "is the earliest sketch of a decoy and its pipes, as now used, in existence." In this we cannot agree with him. We have not made any special search for early engravings on the subject, but we happen to have met with two which are much older than the one which he has reproduced.

One of these occurs in a collection of prints by Antonio Tempesta (obl. fol.), entitled "*Venationes Ferarum Avium Piscium Pugnæ Bestiariorum et mutuae Bestiarum: Delinæatæ ab Antonio Tempesta: Andreas Vaccarius formis Romæ 1605.*" Plate 2 of the "first book" represents the mouth of a decoy-pipe surrounded by trees, with fowl being driven up by two dogs, one swimming, the other on the bank, and two boats being poled along by men; a few ducks on the wing. An earlier edition of this work is dated Rome, 1602, and a later one Amsterdam, 1627; but, not having seen the former, we are unaware whether it contains the plate of the wildfowl decoy or not. The same plate, however, occurs in a collection of Tempesta's engravings with a different title, namely:—" *Aucupationis multifariæ Effigies artificiosissime depictæ et inventæ ab Antonio Tempesto Florentino. Excusum Amstelredami apud Nic. Jo. Visscher A°. 1639.*" In this collection the plate in question is the eighth of the series.

Tempesta was a pupil of Stradanus (Jan van Straet), who was born in 1536, and died in 1605, according to some authorities, or, as others say, in 1618; and it is quite possible he may have engraved some of the plates attributed to Stradanus in a work with a similar title to his own,* published many years previously,

* "*Venationes Ferarum, Avium, Piscium, pugnæ bestiariorum et mutuae bestiarum depictæ a Joanne Stradano. Editæ a Philippo Gallæo, earmine illustratæ a C. Kiliano Dufflæo, Antwerpiae apud Joannem Gallæum*" (obl. fol., n. d.).

but without any date on the title-page. On the other hand, after the decease of Stradanus, the publishers of the later editions may have credited the pupil with some of the master's works.

However this may be, we have seen a much earlier print of a decoy in a collection of engravings published in 1582, with the following title:—“*Venationis Piscationis et Aucupii Typi*. Joes Bol depingebat; Philip. Galleus excud. 1582” (sm. obl. fol.), engraved title, and 47 plates. Plate 27 represents the mouth of a decoy-pipe, with reed screens on both sides, sheltered by trees; in the centre of the pool a dog is swimming and driving the fowl towards the pipe; while to the right of the picture, and behind the reed screens, men are peeping through holes to watch the result. In the left foreground an empty boat is moored alongside, and on the horizon a few fowl are on the wing. The position of the dog, represented as *driving* the fowl, is the only fault in the picture. This is clearly a mistake of the artist, who, although he sketched the decoy with its reed screens correctly, evidently did not understand the *modus operandi*, and placed the dog in the open water instead of in the pipe. That this is so is clearly shown by the Latin lines (the italics are ours) which are inscribed at the foot of the print, and which tell us that the fowl were “enticed” :—

“Sic per insidias sinuosa et retia mollis
Allectatur anas, cane per dumeta natante.”

Here, then, we have evidence that the present mode of constructing and working a decoy was known in Holland at least as early as 1582, or eighty-three years before the date of the engraving characterised by Sir Ralph Gallwey as the earliest of the kind in existence. This, however, adds nothing to the history of the introduction of decoys in England, concerning which any information additional to that collected by Sir Ralph Gallwey can now only be discovered by accident.

If we are obliged to express our regret that no better account of the early history of decoys in England is to be had than that which is supplied in ‘The Book of Duck Decoys,’ we feel bound to add our conviction that no fuller information can be found anywhere else than that which relates to the past and present situation of English decoys, and the details of their construction and management. The book, in fact, appeals not merely to

sportsmen and naturalists, but to all those who, with antiquarian tastes, like to know something of the past history of the county in which they reside, and the rural pursuits of their ancestors. The numerous plans and full-page illustrations with which it is adorned add much to its instructiveness, and betoken the great pains bestowed upon its production.

Our Irish Song Birds. By REV. CHARLES W. BENSON, M.A., LL.D., Head Master of Rathmines School, Dublin. Post 8vo, pp. 189. Dublin: Hodges & Co. 1886.

As a contribution to a larger and more important work on the avifauna of Ireland, which is still much needed, Dr. Benson's little book will serve a useful purpose. It cannot be said to be exhaustive even so far as it goes, for it is not so much a general history of Irish song-birds as a personal narrative of the writer's experience within a comparatively limited area.

Several species have been included which have no claim to be regarded as song-birds, while of others which only visit us in winter the song is never heard in Ireland.

A few undoubted songsters are admitted into the list on what appears to us to be very slender evidence. The Nightingale, for example, is one of these, and we cannot help thinking that some mistake must have been made in regard to locality in the case of the specimen preserved in the Museum at Queen's College, Cork, which is said to have been procured at the Old Head of Kinsale. As yet we are not aware that any properly authenticated specimen of this bird has been obtained in any part of Ireland.

One of the most interesting birds noticed by Dr. Benson is the Redstart, whose breeding in Ireland for the first time was made known by him only last year. The nest was found in the Deer Park at Powerscourt.

We notice here and there a want of precision in some of the author's statements, as, for example, the persistent use of the word "variety" when "species" is evidently intended. It is well to be accurate, but we are loth to find fault with a book which has been designed with so good an object, and written for the most part from personal observation in Ireland.



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ANIMAL LIFE IN HIGH LATITUDES ON THE NORWAY COAST.

BY S. O. RIDLEY, M.A., F.L.S., and H. N. RIDLEY, M.A., F.L.S.,
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THE following short notes, from observations made during an eight-days' steamboat cruise from Thronthjem to the North Cape and back, may perhaps be interesting to those readers of 'The Zoologist' who as yet are strangers to the beauties and wonders of this magnificent coast. The writers left Thronthjem on the 14th and returned to it on the 22nd July last, being favoured with beautifully clear and calm weather. They landed at five different places, spending in all about fifteen hours on land.

VERTEBRATA.

In accordance with what we had been led to expect, Cetaceans of considerable size were seen more than once on the voyage. Porpoises were common, and at several spots large specimens of the Killer, *Orca gladiator*, were seen slowly surging through the water, with a very different motion to that of the smaller and more active Cetacea. At one spot, Asta Fjord, among the Lofoden Islands, five or six Dolphins of a somewhat rare species, *Delphinus acutus* (the White-sided Dolphin), swam for a considerable distance alongside of the vessel, with which they easily kept pace, although it was going about twelve knots an hour. They went at a great rate through the water, hardly sinking out of sight, but swimming just below the surface, so that their

colours and markings could be easily seen through the water. They did not at any time leap out of the water like the Porpoises, but simply rose gradually to the surface to breathe, and sank again till their bodies were just covered, without slackening speed. According to the descriptions in the books which we have consulted, the back of this species should be mainly black; but these individuals were of a light brown colour, in marked contrast to the jetty-skinned Porpoises, a number of which were splashing about at no great distance.

Tromsö is one of the great whaling stations on the coast, and there were a number of carcasses of whales in an unpleasant state of decay at various spots in the fjord. Three fine specimens of the Humpbacked Whale, *Megaptera boops*, had been captured close by a few days before our arrival, and were lying unmutilated near the town. There were two females and one male. The flippers, in one individual at least, were dark-coloured above, instead of being entirely white. The under parts of the body also were marbled with white. They were much infested with large sessile Balani (*Coronula diadema*), especially in the region of the anus and along the sides of the mouth; and a Lepadid (probably *Conchoderma* sp.) was obtained from one or other of the whales by a member of our party.

In the neighbourhood of Tromsö, just opposite the town, and again further south, the presence of a Seal was indicated by the sudden rising out of the water of whole shoals of small fish, but the animal was too wary to show his head above water. It was very interesting to see the Gulls carefully watching his movements, and darting on the fish driven by him to the surface. Perhaps one of the most striking phenomena to a naturalist in the Arctic Regions during the summer is the way in which the mammals and birds continue to seek their food, and roam about during the night as well as the day. It is true that we often saw Gulls roosting on the crags in small flocks in the bright glare of the midnight sun, but the Razorbill and Puffin were fishing in the sea and the Reindeer feeding on the summit of the North Cape, at 12 o'clock at night, and even a species of Humble-bee, *Bombus brevigena*, was at the same time collecting honey from the rich vegetation on the east side of the island of Magerö.

Among the birds the Raptores were represented by the great Sea Eagle, *Aquila albicilla*, of which a pair were seen soaring

about the high cliffs above the fishing-station of Henningsvaer, about half-way down the eastern face of the Lofoden Islands (Vaagö Island). Solitary specimens were seen at a few other spots, including the Melfjord, close to the Svartisen Glacier (about 67° N. lat). Here a fine Eagle was soaring over the water between the mainland and a small island, on which he eventually seated himself, apparently entirely disregarded by a flock of six or eight Scoters, which were swimming about near the same spot. Just as we were leaving the magnificent glacier, the well-known cry of the Curlew was heard, and four of these birds, the only ones seen on the voyage, flew down to the beach. The Scoter was the most abundant of the Duck tribe seen on the fjords, but the Eider Duck was far from rare in spots, and two or three broods of flappers were met with in one place. A much shyer bird, which often occurred singly or in pairs, but never near enough to view clearly, appeared to be the Merganser. Little Auks and Razorbills were common everywhere. Cormorants and Shags were only seen at comparatively few spots, chiefly among the Lofoden Islands. Very few Terns were seen; they appeared rather to haunt the extreme ends of the southern fjords than their more open parts or the wilder northern ones. The enormous colony of Gulls at the famous Sværholts-klubben seemed to consist almost exclusively of the Common Gull, but among the cloud which flew up when a gun was fired were visible Herring Gulls, Greater Black-backed Gulls, Oystercatchers, and Razorbills. Most of the flocks of Gulls seen in the northern fjords were attended by a pair of Skuas (*Lestris parasitica*), the majority of which belonged to the completely dark form, the pale-breasted variety being much rarer, and indeed only seen once or twice.

MARINE INVERTEBRATA.

At nearly every place at which we landed the littoral marine fauna appeared extremely limited; in fact, little was noticed on the shore but Gasteropods of the genus *Littorina*, on the rounded stones and dwarf *Fucus* which usually form the bottom between tide-marks. There can, however, be little doubt that this is mainly due to the extremely slight tides which occur along the greater part of this coast—they are stated to have a rise and fall of only one yard in the southern part of Norway (Skagerrack coast and west coast to the south of Bergen), and our observations

tend to confirm this limit. The tides increase indeed further north, as a fall of about eight feet was observed in one of the extreme inland arms of the Hardanger Fjord, and a considerable tract of shingle was laid bare off Throndhjem, but Hammerfest was the only place at which anything was observed at all comparable to the tides on our own coast. Here a fall of perhaps ten feet was observed, and here at the same time a really rich littoral fauna occurred. Mollusca of bright colours (*Littorina* sp., a large Nudibranch of the genus *Doridopsis*, &c.); of Hydroidea, *Clava* sp. with orange heads, in abundance on the stones between tide-marks. Groves of fine Algæ waved to and fro in the clear still water of the Sorö Sound between the island of Kvalö, on which Hammerfest stands, and that of Sorö, *Laminaria* and *Delesseria* being especially luxuriant, the latter already commencing to decay. Among the stones in the rock-pools occurred an Anemone with warty column (perhaps *Tealia*). This and a dark red Actinian (possibly *Actinia mesembryanthemum*) at Torghatten Island (lat. $65\frac{1}{2}^{\circ}$) were the only representatives of their group observed on this coast. Further evidence of the richness of the fauna was afforded by the anchor when hauled up, the Decapod *Maia*, abundant *Polyzoa* on weed, Nereid worms, a mollusc, *Onchidiopsis glacialis*, being obtained in this way, and in the mud a rich harvest of characteristic Arctic Foraminifera, similar to those found in deep water off the Shetland Islands, and a fine series of Ostracode Crustacea. The harbour was full of a very fine colourless *Beroë*, fully four inches long (probably *B. cucumis*).

Unfortunately time did not admit of dredging here, or many more forms would doubtless have been added to the list, but enough was seen to show how favourable a point Hammerfest would be for observations on subarctic marine life, and, considering its sheltered position and its comparatively civilized surroundings, we recommend it strongly as a situation for a zoological station should it ever be thought desirable to investigate Arctic waters by such means. The climate (it having the same mean winter temperature as Christiania) must be incomparably more endurable than that of Jan Mayen Island, where the Austrians have already a meteorological station. The proximity of Hammerfest to the North Cape naturally leads us to notice a few but significant indications of interest in the zoological relations of that famous headland.

Nothing special was noticed on the shore in the short time available between landing and returning, which was devoted to botanical observations; but owing to the kindness of a Swedish brother naturalist, who gave us the specimens, brought up on fishing-lines, we are able to record the occurrence here of various Ascidians, *viz.*, a fine *Amauroucium?* of globular form, possibly new to Science, some Polyclinums, and a simple form (*Cynthia?*), also various Polyzoa (*Retepora*, and fine *Cyclostomata* of Arctic *facies*). A *Lernæa* and a slender Nematode worm were also extracted from the gills of a cod caught here.

At Tromsö, in the narrow channel between the island and mainland, we were able to dredge in five to fifteen fathoms, besides obtaining numerous anchor specimens: the results show an abundant if not very remarkable fauna; of Echinoderms, *Cribrella sanguinolenta*, *Strongylocentrotus droebachiensis*, *Uraster rubens* (the two latter abundant, and exhibiting much variation in colour), various Worms (both free and tubicolous), Polyzoa, Cirrhipedia (especially on cinders cast overboard by steamers and on Melobesia nodules), a solitary Sponge (*Esperia*); numerous shells, mostly small (a very pretty Limpet, *Acmæa testudinalis*, a highly coloured little *Chiton*, *Margarita helicina*, *Cardium fasciatum*, *Bela pingelii*, *Lacuna divaricata*, &c.* Two species of Prawns, one scarlet, the other a fine umber-brown, and two *Cuprellæ*, one yellow and one claret-coloured, were also collected.

At the next southernmost locality at which we landed, the Melfjord, terminated by the sandy moraines and low delta deposited by the Svartisen glacier, the fauna is probably poor, owing to the fine glacier mud brought down by the glacier; this mud however itself shows a numerous, though somewhat starved, series of Foraminifera, as we are able to testify through the kindness of Mr. H. B. Brady, who has examined it. On the shingle a great number of Medusæ of large size (probably *Cyanea capillata*) were stranded, and some fine dead examples of the shell *Cyprina islandica*—perhaps brought there by Gulls—lay among the round stones.

Medusæ attracted our attention throughout the cruise from

* For the names of these Mollusca we are indebted to Mr. Edgar Smith, for those of the Echinoderms to Prof. J. Bell, of the Natural History Museum.

their extreme abundance. The great *Cyanea capillata*, with its rust-brown umbrella and apparently interminable streamers, occurred almost everywhere, except perhaps in the extreme north; and its marvellous profusion is well shown by the fact that never, so far as we remember, was the anchor drawn up without the chain exhibiting entangled streamers detached from specimens which drifted across it. *Berox* has already been noticed from Hammerfest. A discoid form, about five inches across, with a very narrow white margin to the umbrella, but otherwise colourless, was not uncommon in the south (Christian-sand), also *Aurelia aurita*? These, coupled with the abundance of the attached Hydroid stages below the surface, made known by M. and G. O. Sars and Storm, promise well for work among the delicate and beautiful *Hydromedusæ* with the surface-net on this Gulf-Stream-washed coast; whilst dredging, even if we had not had the evidence of so many eminent naturalists (McAndrew, Sars, Daniellsen, Norman, Lankester, and others) from the Lofoden Islands, Vigten Island, Throndhjem, Molde, and the southern fjords, will be seen from the above notes to offer the expectation of rich harvests in the future.

ORNITHOLOGICAL NOTES FROM NORTH NORFOLK.

BY J. H. GURNEY, JUN.

THE following are the only noteworthy facts in Ornithology, in the first half of the year 1886, which relate to the district usually comprised in these notes. Of the very remarkable passage of *Corvidæ* in the spring, some further account is given in the 'Transactions of the Norfolk and Norwich Naturalist's Society' (iv. p. 282); and reference may be made to Mr. P. W. Munns' communication from Cassel, in 'The Zoologist' for June last (p. 246), as indicating an unusual abundance of Rooks and Crows on the Continent. But what is most remarkable is that on two of the days on which they were seen in Norfolk,—March 20th and 25th,—Herr Gütke describes "thousands" and even "millions" as seen by him in the little island of Heligoland, and a great many more were noticed at Hanover ('Seventh Report on Migration,' p. 91). It is quite evident that the movement was

very wide-spread, and in due course we may probably hear of its having been observed at several of the stations for the observation of migratory birds, established by the German naturalists, under the secretaryship of Dr. R. Blasius.

ROOK.—On March 20th thousands of Rooks were seen by Mr. G. Hunt, on the coast at Somerton, going south; and on the same day a considerable number of Rooks and Grey Crows, together with two Buzzards, were seen at Northrepps flying in almost the same direction, E.S.E. On the 21st, 22nd, 24th, 25th, 26th, and 29th, different species of *Corvidæ* were seen in some numbers at Northrepps and Cromer, all going the same way, that is, following the coast-line towards Yarmouth. On the 20th and 21st great numbers were seen passing Yarmouth by Mr. G. Smith. Probably the point of departure lies between Yarmouth and Lowestoft, that is for such as are seen in Norfolk, for no doubt Spurn Point is also a place of departure for the Continent, but Lowestoft is the most eastern town on the British coast; although every spring they are seen going in the same direction, that is to say south or south-east, and even at times, independently of the direction of the wind, they are occasionally seen at the floating light-ships at the same time of the year (*viz.*, in March), going in quite the opposite direction, *i. e.*, north or north-west. Cases in point (referring chiefly to the Norfolk coast) are cited in the 'Report on Migration for 1883' (p. 60). This seeming phenomenon can only be explained by supposing that the wind has been too powerful for them to fly with it, though they might fly against it; for it may be set down as an established fact that all the *Corvidæ* can fly in the teeth of a wind, which if they flew with it would dash them to the ground. It is presumed these retrograde movements would be followed by a flight in the contrary direction as soon as the wind changed, or if it remained very long in an adverse quarter the Crows would risk being drowned in the German Ocean, and would make shift to fly with it, albeit there can be little doubt that at all seasons they much prefer to fly against any wind if possible.

WAXWING.—On Feb. 23rd a Waxwing was knocked over with a catapult at Melton.

LESSER SPOTTED WOODPECKER.—A female of this species was found dead at Felbrigg, on or about Jan. 22nd.

BRAMBLING.—These birds were more numerous last winter

than they have been for some years. On Feb. 20th a flock of three hundred or so rose from a small beech plantation, where the ground had been swept under the trees, and where they fed on the fallen mast. I have very seldom seen them in our parish before. Some of them continued in the wood for several weeks.

GRASSHOPPER WARBLER.—There is a small “broad,” called “Sutton broad,” where this little bird is found. A nest taken in June was on the ground, or only just raised above it, in the marsh grass, cut by mowers as a rank sort of hay; it contained four eggs, and was composed externally of moss. Another nest, taken not far off, though on another water, contained four eggs, and was composed externally and internally of moss, and was much more compact than is usually the case, I believe; but as these are the only nests I ever saw, I am not sure about that point.

GOLDEN ORIOLE.—On May 20th a male Golden Oriole was singing beautifully, and was watched for some time by J. Nudd, at Hickling, a short distance from the “broad.” His accurate description of it left not the least doubt as to its species.

STOCK DOVE.—This bird is not particularly common in North Norfolk; but during and just before the hard weather which prevailed last February some migratory flocks, which had evidently been driven south, made their appearance. Eleven were netted at Northrepps on Jan. 26th, and seventeen more on Feb. 1st; one was shot on the 5th; and another, with six Wood Pigeons, caught on the 15th. On the 22nd, forty-four Wood Pigeons and twelve Stock Doves were caught alive at Hempstead; and on March 3rd, fifty Stock Doves, eleven Wood Pigeons, sixty-seven Rooks, and three Pheasants were all caught at the same time. The ground was covered with snow, and they were evidently very hungry, owing to their inability to procure food.

SNIBE.—An odd rufous variety of the Common Snipe was shot at Cromer, about half a mile from the sea, on Feb. 1st, and is now in the possession of the Rev. A. J. Richards, of Farlington, Hampshire. The rufous tinge was very strong, especially about the neck; and the pattern of the dorsal plumage was somewhat different from the normal type. Mr. Richards says it weighed five ounces, and was very sluggish; much more like a Jack Snipe than a common one. It approximated to the Sussex variety, described in ‘The Zoologist’ (1884, p. 339), but was not so dark. It certainly is not the *S. russata* of Gould.

BITTERN.—On May 27th and again on the 30th the boom of the Bittern was heard at night on “Sutton broad.” After remaining a week or so it removed to another fen, where it was heard and seen several times. On Whit Tuesday it rose almost at the gamekeeper’s feet. Happening to be there the next day, I searched the fen where he had seen it, with four men walking in a line, but could not flush it. There were reports that it had a mate, but these apparently were without foundation.

SHELDUCK.—Two pairs of Shelducks are believed to have nested this year at Blakeney; at any rate, the young of one nest, ten in number, were taken, and the purchaser of them was told of another nest.

LITTLE AUK.—On Jan. 15th a Little Auk was found in Cromer, by the edge of a small stream which falls down the gangway.

NATURAL HISTORY AND SPORT IN THE HIMALAYAS.

By SURGEON-GENERAL L. C. STEWART, F.Z.S.

(Continued from p. 325.)

Theog, Oct. 7th.—Of the Dipper, *Cinclus Pallasii*, I saw three to-day, and shot one; the Mountain Parrakeet, *Palæornis schistoceps*, was observed in a large party flying across a ravine; *Hypsipetes psaroides*, abundant and noisy; *Sibia capistrata*, a few. Observed small flocks of brownish birds, probably Buntings of some sort, on a bare hill-side, half-way, but could not get a shot. Wherever there was lofty forest, Woodpeckers were sure to make themselves known, and in more open parts, or bushes, some kind of Laughing Thrush. The Himalayan Creeper, *C. Himalayana*, a Nuthatch, *Sitta cinnamomventris*, and the lovely little *Dendrophila frontalis* observed in suitable localities; and five kinds of Hill Titmouse, already referred to. *Siva strigula* once or twice seen. I knocked over a King Crow in order to satisfy myself as to the species; it was not, at all events, *Dicrurus albirictus*, and was, I presume, *D. longicaudatus*. *D. cærulescens* was the only other King Crow seen this trip, and it is rather rare above 4000 ft.

I can confirm Col. Markham’s observation that in these mountains their south and east sides are never so thickly wooded as the north and west, which above 7000 ft. are usually pine-clad,

intermixed with yew, chestnut, and other forest trees. The other aspects are prominently clad with oaks of several species, not very thick together, and with a grassy undergrowth. A knowledge of this peculiarity in the vegetation of these regions will undoubtedly aid a person going in for sport, the different ground and feathered game pretty strictly confining themselves to one or other kind of cover. I found this when I went after Tahr, Serow and Musk Deer, &c.; and Monaul, Kalij, Cheere, and other Pheasants.

From a turn of the road near the bungalow there is a magnificent panorama of snowy mountains to the north and west, and from a ridge a little farther on a beautiful contrasting view of the valleys below, with streams like threads of silver winding through them. Saw some Spine-tailed Swifts flying about a cliff far below the road, and some common Swallows, *H. rustica*, at more than one spot to-day. The most common species in these hills is *H. daurica*, whose retort-shaped clay nest is constantly found on the under surface of some slab of rock, or fixed to the roof of a cave, or even a building. I do not think this species breeds in the plains. Another Swallow which also builds a retort-shaped nest is *H. erythropygia*, affixing the fabric to the concavity of some dome or archway by the score together; whereas *H. daurica* is a hermit in this respect, and nestles alone.

After half an hour's rest I took a saunter with my gun. In a considerable clearing above the small group of huts which does duty as a bazaar, I was somewhat surprised to see a pair of Hoopoes, the European species, *Upupa epops*. I did not think they frequented so high an elevation. I saw lots of them at Koteghur, which, however, is only 5000 ft. The other species, *U. nigripennis*, I did not see, or if I did, I failed to distinguish it. Shot a beautiful hill Fox in the gloaming; and saw a large Owl, probably *S. Newarensis*, glide out of a tree, but could not get a second glimpse of him. Capt. T. shot a pair of Flying Squirrels during his evening's ramble, and gave them both to me in exchange for my Fox, a bargain he afterwards repented, as I got four more Foxes before my leave was up, and somehow we came across no more Flying Squirrels. A hill-man brought in some Kalij Pheasants for sale, and was glad to get rid of them here in place of having to trudge on to Simla with them. He arrived in company with a party of a dozen paharees carrying loads of grain in kiltas, or long baskets strapped on their backs, and I noticed

that at least one-third of this party were suffering from goitre. I saw several four-horned sheep tethered on the hill-side, and engaged to purchase one on my way back; which I did, and it lived with me for a year at Kussowlie, when it became mutton, and I have its horns to this day. We passed a miserable night, from the ravages of fleas, or something worse, and resolved to cut very short our sojourn at Theog Bungalow.

Muttecana, Oct. 8th. — Started at peep of day for this place; distance eleven miles; elevation 7700 feet. A fair road most of the way, but rather narrow, with precipitous slopes on either side; and of course not railed in, and with some of the curves and windings fit to give a nervous rider the jumps. We found breakfast being got ready in a lovely spot half-way, in a deep wooded ravine below the road, with a clear mountain-torrent dashing through it; the banks clothed with a variety of trees, many of them festooned with beautiful ferns, and clothed with brilliant mosses and hoary lichens. We resolved to spend most of the day here, and sent the servants on to the bungalow with instructions to have dinner ready by six o'clock. Beating up the Khud I flushed some Wood Partridges, *Arboricola torqueola*, a pretty species whose acquaintance I had made in a former expedition. I shot a brace; and T., who had taken the other side of the Khud, got a brace and a half, killing one of his birds in a tree. I have several times since got the Hill Partridge in the woods near the brewery, and in the botanical gardens at Mussoorie. We found them very good eating, but not so good, perhaps, as Chucores. Two, if not three, closely-allied species are found in the Eastern Himalayas.

In course of the day I got three specimens of *Coccothraustes icterioides*, a pair of *Megalaima virens*, *Pomatorhinus leucogaster*, a beautiful Yellow-crested Woodpecker, *Gecinus flavinucha*, which is a scarce bird; *Ilenicurus maculatus*, *Myiophorus Temminckii*, both species of Water Redstart, *Ruticilla fuliginosa* and *R. leucocephala*; and saw a third, *R. cæruleocephala*, but did not want this species, which is common at Kussowlie. The other Mountain Redstart, *R. frontalis*, oddly enough, we did not see, except at Koteghur; but the best acquisition of to-day was an example of the rare *Tarsiger chrysæus*, a beautiful and remarkable bird of skulking Wren-like habits, generally found solitary or in pairs. I did not get another during our expedition, and Capt. T. knew it not; but

I had seen it in the Calcutta Museum. It is rare in the Western Himalayas, but would seem to be less so towards Nepaul.

I was attracted by the sight of a number of Vultures and several Eagles soaring and circling over the ravine to our right. By the aid of my glass I made out a dead bullock (with a pack of something on its back, probably grain), which had fallen over the precipice. I recognised the Lammergeyer and the Great Brown Vulture busy at the carcass; the Eagles I could not decipher; most likely they were *Aquila fulvescens*, which is as fond of carrion as any Vulture; but they were too far down to tempt a shot, and, if shot, to retrieve them would have been no easy task. Capt. T. had shot, among other things of more or less value, a beautiful female Hobby, *F. subbuteo*, or its Himalayan relative, *F. severus*, we could not determine which on the spot. I observed in several spots small flocks of *Siva strigula*, *Leiothrix luteus*, four at least kinds of Titmouse, *Hypsipetes psaroides*, *Garrulax albogularis*, both species of Hill Jay, the lovely Blue Magpie, *P. erythrorhynchus*, Thrushes of sorts, and Green Woodpeckers, *G. occipitalis* and *G. squamatus*; no other kinds, however.

We cantered in the last three miles, and reached the Muttecana Bungalow with praiseworthy punctuality in time for a fairly earned dinner. We found a hill-man waiting for us, with some Pheasants for sale. He was on his way to Simla with them, like the man last night, but willingly let us have what we wanted. I bought some of the Kalij for the pot, and a single specimen of the Koklas Pheasant, *Pucrasia macrolopha*, a species I had never myself shot, although I possess some skins. The fellow had also a good Bear-skin, which I got for a couple of rupees; and some honey, and a big jar of Bear's-grease, with which last article he failed to tempt us.

Muttecana, Oct. 9th. — Very cold here this morning, the ground white with hoar frost; and the hill-people predict an early and severe winter, but then they always do that. I had a couple of hours' ramble before breakfast, and got some rather good birds: *Gecinus flavinucha*, *Carduelis caniceps*, *Accentor variegatus*, *Heterura sylvana*, *Merula bouboul*, and *Myiagra cærulea*. Saw some Swifts, probably *C. melba*, flying about the face of a precipice with amazing speed, but had no chance of obtaining one. In the forenoon I toiled through a dense growth of underwood towards the top of a mountain above the bungalow.

Oosrao told me we would possibly fall in with Monaul, as they were often found in the more open parts of this forest, but we were not lucky enough to come upon them to-day.

In the afternoon I shot a Musk Deer, *Moschus moschiferus*, unfortunately a female. Both sexes being hornless, it is not easy to discriminate them at any distance. The creature was standing on a rocky knoll within twenty paces of me, and stared at me, unconscious of danger. She fell dead to a charge of No. 5 shot, and was a welcome addition to our larder, the flesh being tender and well-flavoured. I need not say the valuable musk-pod is only possessed by the male; it fetches about sixteen rupees in the market when unadulterated, but it is often tampered with and mixed with all sorts of impurities. I shot another Musk Deer a few days afterwards, again unluckily a doe; and Capt. T.'s shikaree killed a male on our return journey. The Musk Deer affects open woods and the margin of the forests, and is said to make a form for itself like our Hare, roaming from thence but little during the day, but coming into the open glades morning and evening, bounding away when disturbed with a curious whistle, but is not a shy animal when compared with other ground-game. Who knows the use of the long curved tusks? To dig up the roots on which it delights to feed? Yes; but why, then, does not the female possess these implements? Better to have no explanation at all than guess at a wrong one, methinks.

During the day I got a pair of the rare *Picus hyperythrus*, already noticed; *Garrulax variegatus*, *Sibia capistrata*, *Oreocinclla dauma*, *Larivora cyana*, *Nemura rufilata* (male and female), *Ixulus flavicollis*, *Columba Hodgsoni*, and a pair of Blue Magpies. Saw several small parties of the Himalayan Siskin, *C. spinoides*, and on my way home got a pair of *Accentor atrogularis* on a bare rock close to the house. T. had added nothing of special interest to his collection. He took a different beat to mine for the day, and had only some common birds and a fine Crested Eagle, *Spizaetus nipalensis*? He had picked up some Porcupine-quills, and tried to obtain the owner by digging down upon what the Paharries said was the beast's burrow, and then endeavouring to smoke him out; but he gave it up after an hour's toil. The hill-men say the Porcupine, *Hystrix leucura*, is very destructive to their potato-crops. It is common on the lower ranges, and Mr. P., the German missionary at Koteghur, gave me a couple of

flat skins a few days afterwards, which he had killed in his own garden ; but it is not usually found above 5000 feet.

Sitting in the verandah, in the bright moonlight after dinner, enjoying the last cheroot of the day, I spied a Fox stealthily approaching the cook-room, between the stable and the bungalow. I sat motionless for a minute or two, watching him, and soon saw a second Fox join him. I stepped backwards into the room, loaded my gun with No. 5 shot, and went round by the back of the house. I got into the shade behind a pillar, and made out the pair busy at some delicacy they had found near the cook-house. I was within five and twenty paces, and was lucky enough to knock them both over, right and left. They were beautiful specimens, in perfect condition, and with remarkably fine brushes. *Vulpes montana* is a very handsome animal, its coat of a richer and somewhat paler hue than our Fox, but otherwise very near to it. It is common in the N.W. Himalayas, and I got many specimens at Landour, where I once was witness to a curious scene wherein it figured. One bright moonlight night I was just going to bed, when my attendant said, "Cherisher of the poor, there is great sport going on outside ; come and see." He led me to the railing which separated the terrace on which my cottage stood from a bit of kitchen garden on another terrace, some twenty feet beneath. This patch was then partly under green peas, half a dozen rows, duly stuck. One of my pets at this time was a young but full-grown *Ghoral*, a pretty and perfectly tame creature, that used to roam about the place all day, and was driven into a loose box in my stable at night. My servant missing it on this occasion, when wanting to put it to bed, had by chance looked over the railing, and there came upon what he now invited me to witness, which was this : the little Ghoral and a big Mountain Fox having a game of romps in the moonlight ! They chased each other up and down the paths and between the pea-rows, tumbling and jumping about in all directions, the Fox now and then lying down and the Antelope making at him, butting or poking at him with his sharp little horns, after which the chase would recommence, the pursuer and pursued changing places in turns. This little game went on for half an hour, and might have lasted all night ; and there was not, so far as I could see, any attempt at rougher play on either side ; but as I was somewhat apprehensive that a tragedy might be enacted, I pelted

the Fox away, for I had not the heart to shoot him, and called the Ghoral to me. The little beast always came to my whistle, and used to follow me about the house. Much I regretted its untimely end a few months later, which was caused by the kick of an ill-conditioned brute of a horse I had, and which I had just mounted at my door. In an evil moment my pet approached its heels, the brute lashed out, and that was the end of my Ghoral. This Antelope has a wide distribution, and is found all along the Himalayas; but does not reach the loftier ranges, being confined to the lower slopes of from 5000 to 8000 feet. I have shot it in the Tyne range beyond Landour, but it is becoming scarce within hail of the hill stations, the same being much poached. It is usual to find them in small parties on broken rough ground or grassy slopes near or even in the forest. I have always used a few beaters when in search of them, and with fair success; but they are generally stalked, and I killed three in this expedition. A famous Shikaree once told me they would in most cases respond to a loud whistle by stopping and turning round to ascertain the cause. I have tried this dodge, but invariably found the result to be the very reverse. The Ghoral is generally called the Himalayan Chamois. In general appearance it bears a considerable resemblance to the European animal, but its horns are merely *curved* backwards, never in the least degree *hooked*. The Gardens of the Zoological Society just now (1885) possess a fine example of this interesting species, the first, I believe, ever brought alive to Europe; and there was recently in the same collection a specimen of its Japanese cousin, *N. crispus*, a very rare animal.

Muttecana, Oct. 10th.—Started at dawn, with T. and Oosrao, for the Monaul ground, a good climb, through magnificent forest; at first oak, chestnut, rhododendron, chere pine, &c., and higher up deodars. I considered myself well rewarded for the day by bagging a couple of noble cocks and a hen. I was not much surprised that I missed several fair chances; but two of them were long shots, and I was resolved not to throw away a chance. I employed some beaters at first to drive them down towards us, and wish I had not, for several of the birds got up far out of shot; so I sent the men away, and we had better luck by advancing cautiously, T. and I firing as they rose and swept past us down hill. I had never before seen a Monaul, *Lophophorus*

Impeyanus, in his native haunts, and it is a sight worth remembering. T. was less fortunate on this occasion, only bagging one hen. Oosrao declared they would not return till evening, so we descended after doing justice to the breakfast we had brought with us. On reaching the bungalow I set to work at once to skin the Monauls, as Gomez was busy with the birds obtained yesterday, and the carcasses made a goodly stew, added to a foundation of Musk Deer venison and potatoes. I am told that this noble bird comes close to the hill-village in very severe weather, and the Paharries secure numbers of them in the snow. They are most common on the south and east aspects of the hills. where the vegetation is less dense than on the north and west slopes. Oosrao tells me they do not eat grain, like other Pheasants, but dig up roots and bulbs, for which their strong, hooked bill is well adapted. They love acorns, too, and many mountain fruits and berries. They have the credit of being polygamous, and they often roost on trees.

After carefully skinning my spoils of the morning, I took my gun and pottered about till dinner-time. I got a couple more of *Accentor variegatus*, by far the most common of its kind in these parts; a Wall Creeper, on a crag behind the stable; and a Pigmy Owl, *Athene Brodiei*, the smallest (I think) of Indian Owls. A number of Bats were flying about, and I knocked over two species, both of which were quite new to me, and proved to be *Rhinolophus tragatus* and a *Scotophilus* of some sort.

Our dinner was concluded, when up the hill trudged two officers of H.M.'s 10th Regiment, who had been shooting big game in the interior, and had penetrated into Spiti. They had made a good bag, comprising *Ovis ammon*, *Ibex*, and *Burrhel*, besides *Tahr* and *Serow*, and what seemed to be prized as much as any of their trophies, a beautiful Snow Leopard, *Felis uncia*, which Capt. J. had shot at 12,000 feet, and was the first skin of this rare animal I ever saw. We made these travellers very welcome to the best fare we could produce, including the aforementioned game stew and some tinned provisions, to which they had long been strangers, washed down with sundry "horns of ale"; and I sat up a good while listening to a recital of some very interesting details of travel and sport. At parting next morning one of them presented me with a good Snow Bear's skin, and the other with heads of the Tahr and of the Serow, which

they undertook to leave for me at Kussoylie on their journey to the plains, where they were due for duty a few days later. They stayed a couple of days with some of their old friends of my regiment *en route*, and in addition to the above-named valued gifts Capt. J. most kindly left for me a good pair of Ibex horns and a couple of Marmot skins out of a lot he told me he had purchased from some wandering Tartars. I need not say how fired my imagination was by these hunters' descriptions of travel and sport, and how I longed for a share of the like; but in these days it was difficult, almost impossible, for a medical officer to get "long leave" in India, and I had never obtained more than a month or six weeks at a time. I once made a start for the interior on three months' leave, but was recalled before I had gone six marches, on account of cholera breaking out in the station where my regiment was.

Muttecana, Oct. 11th. — Tried for Monaul again, starting for yesterday's ground at dawn, ordering breakfast to follow. Heard Monaul calling or rather whistling all around, and looked out for a good time with them; but I was in bad luck, and only bagged one bird, a fine cock, losing another hard hit. T. got a brace, and that was all we did. Oosrao begged for my gun for the rest of the day (he had only one old single-barrel of his own), and put us both to shame by bringing in at nightfall five beautiful Monauls, three cocks and two hens, all of which were prepared next day. T. tried a distant part of the forest in the afternoon, but could not get within shot of them, although he said he saw them dashing down the hill on all sides of him. I shot a Ghoral on the way home, and wounded and afterwards bagged a second, which was very good shikur, as I was not looking out for them. I fired at no small bird to-day, and took no small shot out with me. I saw what I believe was a Golden Eagle perched on a lofty crag, and tried, but in vain, to circumvent him; and the only bird I secured was a handsome Honey Buzzard, *Pernis cristata*, with half-grown crest. I got a second at Koteghur, and only two or three ever afterwards. T. had ridden back a short way on the Theog Road, having had tidings of a Bear, but saw no signs of him. He brought in, however, a brace of Kalij Pheasants and a brace of Wood Partridges, and had a shot at a Ghoral, but missed. We went to bed early, resolved to have another shy at Monaul on the morrow.

Nakunda, Oct. 12th. — A lot of hill-porters and two or three officers' servants made their appearance in course of the night, and said their masters would arrive to breakfast; so we thought it as well to vacate our quarters at Muttecana, and make for the next stage, as a fellow is only entitled to occupy a bungalow for twenty-four hours should the accommodation be required for other travellers; so we sent our servants and traps with the ponies on to Nakunda by road, eleven miles, and started about 7 a.m. to walk over the hills to the same destination, under the guidance of Oosrao, who knew every inch of the way. The path led us for four or five miles through beautiful woods, a little to the right of our last two days' shooting ground, and as we were bent on higher game we did not fire a shot till we reached the spot where we found the attendants we had sent on a little ahead were boiling the kettle for breakfast. *En route* I spied a couple of the Himalayan Pine Marten, *Martes flavigula*, playing about some prostrate deodar trees, and was sorely tempted to fire at them, but refrained. After a hurried repast and a leisurely cheroot, we struck a foot-path more to our right, and soon came upon what appeared to be very promising ground for Monaul. We beat about the place for some time, and were giving it up, when up rose a magnificent cock, then another, and another, which dashed downward, displaying the large white patch of white over the chestnut tail. I stopped one with a green cartridge, and Capt. T. bagged a brace soon afterwards, cock and hen. Slowly advancing, and without seeing more of them, we came on deodars, and walked a couple of miles through a magnificent forest. The trees were colossal, some at least twenty feet in girth a man's height from the ground. We reached the crest of a ridge, beyond the forest, a savagely grand scene—gaping chasms, huge dislocated rocks, the vegetation consisting mainly of stunted juniper-bushes, and hard slippery grass underneath. On the far side of the ridge we re-entered the region of pines, and trudged along slowly without seeing any game, the only sound to break the silence of the forest being the harsh cry of the Nutcracker and the occasional rattling note of the Green Woodpecker.

At a clearing in the wood we came on a party of charcoal-burners busy at their occupation; they called to Oosrao that they had just seen a Serow cross a bit of open ground to our left. I had brought my friend Major L.'s rifle with me that morning, on

the chance of finding big game. Capt. T. was similarly armed, and I gave Oosrao my gun loaded with cartridge. We speedily improvised a beat, sending the men round in hopes of a successful drive towards the spots where we had taken up our position. Ten minutes elapsed, when out rushed a huge Wild Cat, which, to my dismay, T. fired at, thereby, as I apprehended, stopping our chance of anything better for the time; but luck was in my favour, as a few minutes afterwards a strange-looking animal, trotted out of the wood close to me, turning his head from side to side, and looking round. It was a shot I could hardly miss, and I sent a bullet through his shoulder. He dropped on his knees, but recovering, staggered on a few paces, tried to scramble over a rock, and fell back dead. He was a fine full-grown Serow, with shaggy rough coat a good deal worn, and torn by thorns and burs. My bullet had severed the main artery, close to the heart; a lucky shot, for I am told the Serow is extraordinarily hard to kill, and is pretty sure to get away unless hard hit in a vital part. This was the first Serow I ever saw alive, and I never shot another. I was well pleased with my morning's performance, and the charcoal-burners were liberally rewarded. We found the Serow not particularly good eating,—coarse and dry,—and not worth roasting; but it made good soup, and a praiseworthy addition to a game *pot-à-feu*. The Serow, *Nemorhædus bubalinus*, is a scarce animal, of solitary habits, and has the reputation of being fierce, standing at bay when wounded and inflicting severe wounds with his strong curved horns, which are like those of the Ghoral on a large scale. The horns of this specimen, which are still in my possession, measure eleven inches over the curve, are black, and imperfectly ringed for about half their length, with the points pretty sharp and polished. The beast is found in thick covert bordering on the forests, and also loves rocky hill-sides, thinly wooded, and seldom comes into the open.

As we had a long way to go to reach Nakunda, we walked briskly on, and did not care to fire at anything feathered. Capt. T. shot a Musk Deer, luckily a male, with long canine tusks, and a good pod. I was stupid enough to miss another which was looking at me thirty paces off. I had only a few minutes before resumed the rifle, and given up my gun to the Shikaree. I must have done better with a green cartridge, I flattered myself. Rather oddly, a second Wild Cat was seen on our way down the

mountain, and I had the glory of bagging him, a very fine old tom of *Felis chaus*, with teeth a good deal worn down. Oosrao said he knew this wild beast ate a Monaul every day, and I have no doubt he did, if he caught one. I never saw this species before or since at so high an elevation. It ranges all over India; and I once shot one on the banks of the Indus devouring a good-sized Rehoo fish, which I fancy it must have captured, as there were no fishermen about. This happened to be the only species of the feline race I shot during the expedition.

We reached the Nakunda staging bungalow at dusk, after a good tramp of fifteen miles. We were a little fagged, and not a little ready for dinner. We found—worse luck—the bungalow full. Half a dozen officers *en route* from the interior to rejoin their regiments on the plains occupied all the limited accommodation the three rooms afforded, and it was too cold to sleep in the verandahs. Another, a supplementary bungalow, a couple of hundred yards off, was also fully tenanted, but after dinner I got a shake-down in an outhouse, and of course I had my own bedding. I found that one of the sportsmen was an old friend, W., of the Artillery; but we had not met for some years, and had much to hear and to tell. He had been into Kooloo *viâ* Kangra, but had poor sport, having only bagged a few Burrhel and Tahr, and a couple of Musk Deer; but he showed me some skins, the first I saw out of a museum, of the Snow Pheasant, *Tetraogallus*, and kindly presented me with a pair when he found I was at my old employment of bird-collecting. He advised me to open out and re-poison them, as he had almost run out of preservative material, so I delegated the skins to Mr. Gomez, who made a very good job of them. One of the officers had a magnificent Thibetan mastiff with him, red in colour, and most savage (I was told) in temper, so I gave him a wide berth.

It seemed to be rather a noisy party in the bungalow, and I was, on the whole, glad there was not sleeping accommodation for me, as I would have got little rest; as it was, being pretty tired, I was soon asleep, and never stirred till the morning cup of tea was brought; and as I had little in the toilet way to perform, I was soon afoot to see the sun rise behind a wall of snowy mountains, a scene of surpassing grandeur, the rosy tints imparted to the peaks and the change to cold grey as they fell into shade contributing beauty to a panorama such as I had never before

seen the like of. Nakunda bungalow is most picturesquely situated in the forest, at the foot of Huttoo, a mountain of 10,500 feet elevation; the wood is chiefly deodar, and these giant pines are here to be found at their best; few have fallen to the axe, but some have to natural causes, and here and there a colossus is stretched to rise no more. I wandered about for a while, every few yards bringing me to a fresh peep of beauty and grandeur—magnificent deodar forest all round, with stupendous crags and precipices, and all so still; not a sound but the cracking of a branch under my feet as I walked along or the notes of some bird few and far between. I saw the Nutcracker and some large Pigeons,—that was all of animal life; and I shot nothing before breakfast. On emerging from a clearing in the forest I found myself close to the road again, which zigzagged down to a small bazaar, which I lost no time in exploring. There was scarcely a soul astir as yet; but I made myself heard at some of the huts, and found that I could here obtain all I wanted in the way of supplies, coarse flour for the servants and gram for the ponies, potatoes of the finest quality in abundance, and goats' milk, &c. The purveyor at the bungalow had told me that all supplies for us would have to come from Koteghur, wherein he lied. I purchased what we wanted, and on reaching the bungalow found my Kitmutghar wrangling with a Pahairee for mutton. I bought a very good sheep for a rupee and a half (three shillings), and though it was rather lean, it was found pretty tender and well-flavoured.

Most of the travellers had started, and all had cleared out by noon; so we had the bungalow to ourselves, and I told my people we would stop here for three days. I had a good many birds to overhaul, and a few to skin. Gomez begged hard for a holiday, so I took his work for the day, and sent him out with my gun, accompanied by Oosrao. They returned in the evening with some Pigeons, *Columba Hodgsoni*, and, besides a few common birds, what delighted me was a noble Golden Eagle, *A. chrysaëtus*, an adult female in perfect plumage, shot by Oosrao. This specimen I sent to Blyth, and saw very well set up in the Asiatic Society's Museum years afterwards. I arranged my skins and packed a couple of cases full, to be left here till our return from Koteghur, and then strolled out with my gun. I got nothing worth mentioning, except a single Spine-tailed Swift, of which I came on a small party hawking about some crags not far from home. I

blazed away five times, with this result. I got several more before leaving Nakunda, however. I took a very deliberate pot shot at a hawk of some kind perched on a deodar. I did not know what it was, as the setting sun's rays imparted to it a curious pale hue. It was a very long shot, but the bird dropped dead, and proved, somewhat to my disappointment, to be a common Kestrel! Capt. T. went back some miles of our yesterday's tramp in search of Monaul, but saw not a feather. He had bad luck: came on Cheer Pheasants and a small family party of Ghoral, but bagged nothing all day, except a Pine Marten; so he was not in the best of tempers till after the soothing influence of dinner and sundry cheroots. I went to my couch early, as I was bound for the top of Huttoo to see the sun rise in the morning.

Nakunda, Oct. 13th.—Off at 4 a.m., with a bit of waning moon to lighten the way, intensely cold, and a keen wind enough to cut a man in two. I did not, however, reach the top of Huttoo to-day. Oosrao told me that the forests all around were inhabited by nearly every kind of game known in the hills, so I went in for a day of it. He had started a couple of hours in advance of me, mistaking my instructions, but I found him waiting for me beyond the first ridge. He had shot a Monaul, and seen a Serow and some Ghoral on his way up by another path. I traversed the forest for a couple of hours in vain, and came back to where he had joined me to a hasty breakfast, after which we explored several clearings and got to a second ridge. I heard Monaul calling all about, but none gave us a chance. Suddenly Oosrao, who was a little to the left, stooped and directed my attention to a speck, as it appeared to me, among some bare rocks right in front of me. I could not make out at first what he pointed at, but, on fixing the object with my glasses, soon made out a beast of some sort, which I at first took for a black sheep. My man said, "*Tahr*, Sahib, *Tahr*," and after a steady gaze I found such it was; but a hundred and fifty yards off, and difficult to stalk. Just when we did not want them, a pair of Monauls sprang from the juniper thicket close in front of us, offering tempting shots, and dashed straight on towards the *Tahr*, which had been lying down. He got uneasy, and started to his feet. I lay down flat behind a rock, whence, cautiously peeping, I saw that after a few minutes of scrutiny he had laid down again. He was soon joined by another, which came towards him cropping the short grass as he advanced, and

then stood motionless, right between us and the recumbent one. He was a much smaller beast, with insignificant horns, and a scanty ruff; whereas the other, as we could well make out with the glass, was full-grown, with good horns, and fine shaggy mane and ruff. Cautiously peeping out by the side of our sheltering boulder, after a quarter of an hour's suspense, I found the big one still lying down, and the other still browsing unsuspiciously and on his knees to it; but they were in an unfavourable position for a shot, at least the big one was; so after a brief whispered consultation I sent Oosrao round, as he swore he could circumvent them and drive them towards my position. After an anxious delay of what seemed an hour, but was in reality only twenty minutes, the big one, evidently suspecting something, got up and looked all round, but, seeing no danger, lay down again, after scratching his flank with his horns. Again he rose, and was joined by his companion; and they both began, to my dismay, to walk away from me, and towards the direction where I expected Oosrao ought to be. They changed their minds, however, and trotted back, the big one leading. I heard a whistle, and they stopped short; another louder whistle from Oosrao, and they came right towards me for fifty yards, when the small one diverged among some rocks, the other stood for a second or two stock-still, as if halted by word of command. I took a steady aim, and on pulling the trigger was glad to see him down on his knees and head, and half tumble over. He recovered, and was beginning to make off down the hill, when Oosrao showed himself; and he turned towards me, swaying about and staggering, finally disappearing behind a crag. I saw he was badly wounded, and I soon found good proof thereof by evidence of frothy blood. How I longed for a dog at that moment; but Oosrao assured me he would retrieve him, and was as good as his word, following him up by the blood-spots and finding him moribund under a rock a couple of hundred paces from where he had been shot. He was soon despatched, and by our united efforts was conveyed to a conspicuous spot, where we tied a bit of my follower's pugree to the end of a stick, flagwise, and sent four Coolies for him in the evening. This was the best Tahr I had ever shot—fat and in good condition, with thick broad horns (now on a shield above my head as I write), and very fine mane and ruff. Oosrao told me he could always tell a Tahr's age by the rings on his horns; if

so, this specimen was ten years' old. The Tahr, *Capra Jemaiica*, is met with throughout the lesser ranges up to the snow. The few I have had the luck to kill have been on the confines of forest, in difficult stalking-ground, and they are very wary and shy.

Capt. T. had been exploring some crags on the north side of the mountain, and brought in a couple of Choughs, *Fragilus graculus*, which he found in abundance, but hard to get at, from the precipitous nature of the ground. This bird, which has been thought by some ornithologists to be distinct from the European species and named *F. Himalayanus*, is very common in the interior at high elevations. Of the other species, *Pyrhcorax alpinus*, the Yellow-billed Chough, we procured no examples, although it ought to have been observed. T. got no game of any sort, and only brought in, besides the Choughs, some Grosbeaks and an assortment of the more common birds usually met with in pine-woods. He reports having seen Ghoral, but did not get a shot at them.

Nakunda, Oct. 14th.—Got to the top of Huttoo this morning, but not to see the sun rise, being late in starting. Bitterly cold, but the ascent not so hard as we had anticipated. We got to a sheltered nook to kindle a fire and boil the kettle, and were well repaid for our toil by the magnificence of the mountain panorama all around us, far and near; but we did not come entirely to contemplate scenery. I had been enquiring from Oosrao and others about the little so-called "Mouse Hare," *Lagomys Roylei*, and was assured it was to be found on Huttoo. The information was verified, and we got five specimens to-day; and my Shikaree brought me three others on the morrow. Of all snap shots, in my experience this is the most difficult. They disappear almost as the trigger is pulled, and we spent almost the entire day procuring those five specimens, as after a shot not one would reappear under half an hour or more. I considered myself lucky in nailing a couple out of six shots. Capt. T. proved himself a better snap-shot, and killed three out of five fired at. This little animal, which is (badly) figured in Royle's 'Botany &c., of the Himalayas,' is not, I believe, found under 10,000 feet, and lives in small communities, among rocks and stones, passing through a long winter sleep, like the Marmots, and burrowing far and deep in the earth. I tried to get down to their chambers to-day, but we had stupidly brought with us no suitable implements for the

purpose. The stomachs of all we opened contained what seemed to be finely-masticated roots, probably of a species of *Artemisia*, which grows all over the place. The fur of this creature is beautifully soft and silky. We saw no game of any kind to-day, although we tried for Monaul all the afternoon. I saw a very large Eagle questing the side of a hill, and believe it could only have been *A. chrysaëtus*. Oosrao pointed out the eyrie of a Lammergeyer in a perfectly inaccessible position half-way down a stupendous crag, and told me he knew the same birds had resorted to it for the last five or six years.

(To be continued.)

NOTES ON THE VERTEBRATE ANIMALS OF LEICESTERSHIRE.

BY MONTAGU BROWNE, F.Z.S.

Curator, Town Museum, Leicester.

(Continued from p. 331.)

Order GAVIÆ.—Family LARIDÆ.

Sterna macrura, Naum. Arctic Tern.—An accidental visitant, chiefly in spring. In 1842 it was unusually abundant between the 7th and 10th of May, the streams and pools of the county being visited by small flocks. I procured an adult male from Saddington Reservoir, on May 25th, 1886.

Sterna fluviatilis, Naum. Common Tern.—Of accidental occurrence on spring and autumn migration. Has been found at Groby Pool, Coleorton, Lowesby, and Aylestone, as well as on the River Soar, close to the town of Leicester, immediately below the castle. A specimen is recorded, in the MS. Donation Book, as having been shot at Leicester, November 13th, 1858. Mr. Ingram writes that “the Common Tern visits the Belvoir Lake occasionally, generally after strong easterly gales.”

Sterna dougalli, Montagu. Roseate Tern.—I insert this rare species on the authority of Harley, who states that one was shot on Groby Pool in the summer of 1836, and was examined by him shortly after its capture. He especially refers to its bright orange feet.

Hydrochelidon nigra (Linn.). Black Tern.—Of accidental occurrence on spring migration. Has been found at Groby Pool,

Coleorton, and Saddington Reservoir. A Black Tern was shot by Mr. W. A. Heap, of Melton Mowbray, on Aug. 4th, 1884, as it was flying about a ballast-hole, filled with water, about two acres in extent, close to Melton. Mr. Edward Bidwell informed me that he bought a specimen in Leicester, which was said to have been killed in the Abbey Meadow. I purchased for the museum two adult specimens, which were shot near Belgrave on the 24th April, 1886, out of a flock of over forty. Mr. G. H. Finch, M.P., reports a pair of this species killed at Burley Ponds, Oakham, Rutland, in April, 1886; and Mr. R. Tryon reports another, also shot at Oakham, about the same time.

Rissa tridactyla (Linn.). Kittiwake.—Of accidental occurrence in spring and autumn. Has been met with on the Soar, on Groby Pool, at Ashlands, Upton, and Saddington Reservoir. One shot at the last-named place on Oct. 15th, 1881, is now in the Leicester Museum. Another was shot at Gumley, Jan. 3rd 1880. A mounted specimen, in the town Museum, was found dead at Evington; another, purchased for the Museum, was also found dead, in the Abbey Meadow, on Feb. 7th, 1881.

Larus fuscus, Linn. Lesser Black-backed Gull.—An accidental visitor of rare occurrence. The late Rev. Arthur Evans recorded, in his notes, the occurrence of a specimen on Groby Pool in 1850. In the autumn of 1880 I saw an adult specimen from Bradgate. The Leicester Museum also possesses an immature specimen, shot at Melton in 1881.

Larus canus, Linn. Common Gull.—Of accidental occurrence, especially after stormy weather on the east coast. The Rev. Churchill Babington, in the Appendix to Potter's 'History of Charnwood Forest,' says,—“Often seen and shot; flocks of Gulls, probably *L. rissa*, as well as this, frequently fly over Thringstone after violent storms. None, except the Common Gull, have fallen into my hands.”

Larus ridibundus, Linn. Black-headed Gull.—An accidental straggler. Formerly not uncommon about Ashby Wolds. A pair, in winter plumage, shot at Belgrave, Nov. 3rd, 1881, are now in the Leicester Museum. An immature bird, in the possession of Mr. T. Stevenson, of Kibworth, was shot some years ago at Thornton Reservoir.

Larus minutus, Pallas. Little Gull.—A very rare straggler from the coast. Elkington states that some sixteen or seventeen

years ago a specimen was shot between Old Belgrave Locks and "Lady Bridge," and was sold by him to "Old Mansfield," a Birmingham eye-maker, since deceased.

Stercorarius catarrhactes (Linn.). Common Skua.—Although this species is mentioned in Potter's 'History of Charnwood Forest' as having been taken at Wymeswold, I should imagine that *S. pomatorhinus* was probably the species procured; especially as Harley mistook one for the other, and subsequently corrected his error.

Stercorarius pomatorhinus (Temm.). Pomatorhine Skua.—A rare and uncertain straggler from the coast. One shot near Leicester, in Nov., 1846, being merely wounded, was kept some time in a state of captivity. Another, an immature bird, killed near Hinckley in the autumn of 1879, and secured for the collection of Mr. R. W. Chase, of Birmingham, has since been presented by that gentleman to the Leicester Museum, which also contains an immature specimen shot at Somerby, in Nov., 1881, almost identical in plumage with that last mentioned.

Stercorarius crepidatus (Gmelin). Richardson's Skua.—A rare straggler from the coast. In the autumn of 1880 I saw, in the possession of a man named Donnell, a nearly adult specimen, said to have been shot at Enderby.

Order TUBINARES.—Family PROCELLARIIDÆ.

Procellaria pelagica, Linn. Storm Petrel.—A rare and accidental straggler from the coast. Harley has noted one shot close to the town of Leicester, on the River Soar, a few yards below the West Bridge. Mr. Macaulay states (Mid. Nat., 1882, p. 80) that in 1862 another was found dead at Gumley, and is in the possession of Rev. A. Matthews. The late Mr. Widdowson wrote, "Several have been picked up dead near Melton"; and Mr. G. H. Nevinson has one that was caught in Dover Street, Leicester, about three years ago.

Procellaria leucorrhoa, Vieill. Leach's Petrel.—A very rare straggler from the coast. Harley states that one, collected by the Leicester Literary and Philosophical Society, was obtained in the county, but the precise locality is unknown. Dr. Kennedy informed the author of the 'History of Charnwood Forest' that one, found in Gopsall Park, was in the possession of Earl Howe.

Puffinus anglorum (Temm.). Manx Shearwater.—A rare

straggler; sometimes driven inland by gales on the coast. According to Harley, one was captured in a turnip field, near the River Soar, at Cossington. Mr. Macaulay states (Mid. Nat., 1882, p. 80) that in November, 1867, one, picked up nearly dead at Gumley, is in the collection of Rev. A. Matthews; and another was found dead at Billesdon in 1879. A fourth was caught alive at Nether Broughton, on Sept. 2nd, 1879; a fifth was found in a pigstye some seven or eight years ago; a sixth was caught by a retriever in a hedge at Billesdon, Coplow, in Dec., 1880; and Mr. Potter, of Billesdon, reports that in 1877 a specimen was killed by Mr. T. Tomblin, of the Coplow Farm.

Order PYGOPODES.—Family COLYMBIDÆ.

Colymbus glacialis, Linn. Great Northern Diver.—The only authority I have for including this species in the present list is a statement by the late Mr. Widdowson, that it “has been killed here in immature plumage”; but as both of the following species, especially *C. septentrionalis*, so often do duty for this much rarer bird, I am inclined to think it “not proven.”

Colymbus arcticus, Linn. Black-throated Diver.—A rare straggler from the coast, and seldom found inland in mature plumage. According to the Rev. Thomas Gisborne, a specimen was met with at Donington Park. Upon this Harley remarks that “a second is reported to have been killed at Mountsorrel in 1850.” More recently it was met with, on Jan. 4th, 1854, when he examined a male in mature plumage; its weight was 4 lbs. 7 oz. Another, a female (in the plumage of the Lesser Imber of Bewick), was shot in the Abbey Meadow on the same day, probably driven inland by the gale which prevailed on Jan. 4th, and the severity of the north-east wind, which brought a hurricane of snow. The MS. Donation Book, Leicester Town Museum, contains an entry under date Jan. 4th, 1854, to the effect that an immature male was shot at a mill near the Abbey Meadow; and another, also immature (sex not stated, and presented by Mr. N. C. Stone), shot at Aylestone, Jan. 10th, 1854. Macaulay states (Mid. Nat., 1882, p. 72) that “one was shot on Saddington Reservoir in Feb., 1874.”

Colymbus septentrionalis, Linn. Red-throated Diver.—A straggler inland, chiefly in winter, and nearly always in immature plumage. According to the Rev. Churchill Babington,

one was killed at Groby, by the keeper of the Earl of Stamford, in immature plumage. Harley says, "Captured during the storm, which prevailed on the 4th Jan., 1854, in several parts of the county; but in no instance, I believe, in its perfect state of plumage. It has been frequently met with on the Soar, about Loughborough, and also on the Trent. It has likewise been shot on the Wreake; and on such pools as those of Groby, Saddington, and Dishley." In Oct., 1885, at Carlton Curliu Hall, I saw an immature specimen contained in a case, on the back of which was written, "From Saddington Reservoir, Dec. 16th, 1840, shot by Mr. Hayes Marriott." Mr. T. Freer, of Aylestone, showed me a fully adult specimen (red-throated), shot in 1869 (Sept. 10th?), in the canal between the "West" and "Mill Lane" Bridges, Leicester.

Family PODICIPIDÆ.

Podiceps cristatus (Linn.). Great Crested Grebe.—A spring visitant, sometimes remaining until winter. Potter ('History of Charnwood Forest') was informed by the Rev. A. Bloxam that an example of this bird had been killed on Groby Pool. Others have been met with on the River Soar, about Loughborough and Barrow-on-Trent, near Donington, and elsewhere. Mr. Macaulay was the first to discover and record its breeding in the county, at Saddington Reservoir. In the spring of 1883 a pair nested there, and brought off their young. In 1885 the same or another pair nested again; but some of the eggs being taken, they forsook the water. This year (1886) several pairs nested there, and were so common that I was enabled, through Mr. Macaulay's exertions, to get a nest with eggs for the Museum, on June 1st. At Naseby Reservoir, Mr. Symington reported them as abundant. Others appeared also at Thornton and at Belvoir, from whence a pair was sent. Their stomachs contained nothing but a quantity of Grebe's breast and side feathers, probably their own(?), some few seeds, sand, and a greenish oily substance, probably derived from fishes they had swallowed. Mr. Macaulay's earliest record for the appearance of this bird is Feb. 17th (1885); the latest, Nov. 12th (1881).

Podiceps griseigena (Bodd.). Red-necked Grebe.—According to Mr. Macaulay (Mid. Nat., 1882, p. 79), "one was shot on Saddington Reservoir in 1874"; and it appears by his MS. notes

that the date was March. This is probably a mistake; the bird may have been the Little Grebe in spring plumage.

Podiceps auritus (Linn.). Slavonian Grebe.—A rare winter visitant. Harley mentions one shot on Groby Pool; others have been met with on the Soar, Trent, and Wreake. Widdowson reports one, in immature plumage, occurring at Melton.

Podiceps nigricollis (C. L. Brehm). Eared Grebe.—A rare visitant; and probably Harley is mistaken when he says of this species, "Formerly more abundant, and pretty well distributed over the county. Chaplain procured it, however, on Groby Pool."

Tachybaptus fluviatilis (Tunstall). Little Grebe ("Didopper," "Dabchick").—Resident and sparingly distributed. Potter, in his 'History of Charnwood Forest,' says, "Rothley, Groby, &c.; but not abundant." It is common on the Soar, Trent, Wreake, and other streams, as well as on most large waters, as Saddington, Groby, and Bosworth Pools. Young Grebes have a shrill call-note, which they incessantly keep up when they first come abroad on the surface of the water. Mr. W. A. Evans presented to the Museum a nest and three eggs, taken by him at Thornton Reservoir on 9th June, 1881. Mr. Ingram writes word that it "breeds in Frog Hollow Pond, near Belvoir." I saw one on Bosworth Pool on 6th Dec., 1884; and shot one at Belgrave, by the sewage weir, on 10th February, 1886.

Family ALCIDÆ.

Lomvia troile (Linn.). Common Guillemot.—Mr. Macaulay states (Mid. Nat., 1882, p. 79) that he has a specimen "shot many years since on the River Soar, at Cossington, by the miller who then resided there."

Mergulus alle (Linn.). Little Auk.—A rare straggler from the coast, driven inland by severe weather. According to the Rev. Churchill Babington, "A pair of these birds were taken at Nanpantan, Nov. 6th, 1837, in a turnip field, by Mr. Cartwright, of Loughborough, who endeavoured, without success, to keep them alive on fish and insects." Writing of the Little Auk, Harley says, "During the autumn of 1838 it appeared in Leicestershire; and a pair, in a semi-exhausted state, were picked up amongst the hills of Charnwood Forest. In the autumn of 1840 this species again occurred in the county and adjoining districts." Widdowson writes, "Several have been

picked up at different times near here." Rev. R. Hunt, of Carlby Rectory, Rutlandshire, writes, "Two were picked up after a storm, in 1885, in Essondine parish."

(To be continued.)

NOTES AND QUERIES.

BIRDS.

Two Cuckoos fed by one pair of Wagtails.—As bearing on the subject of Mr. Kelly's letter in 'The Zoologist' (p. 368), I think the following incident may be considered worth recording:—While on a visit to a friend in Derbyshire, on the 8th August, I saw two young Cuckoos being fed by one pair of Pied Wagtails. The Cuckoos were perched upon an iron fence which enclosed the lawn, and were usually about thirty or forty yards apart. When my attention was first drawn to the spot by the cries of the nestling Cuckoos, it was about 9.30 a.m., and at that time a single Wagtail only was to be seen. At 10.30, with a strong glass, I made out that the male Wagtail alone was feeding the Cuckoos. At 12.30, and at different times throughout the rest of the day, the female Wagtail alone was seen to feed both the Cuckoos, her mate not being in sight at all. The place was quite open, and the Wagtail was always able to find sufficient flies within a very few yards of where the Cuckoos sat, either on the close shorn turf of the lawn, or in the longer grass on the outer side of the fence. The group was watched by many of us at the same time, the three birds being all together in our sight; and it was perfectly evident that while we watched them, during most of the afternoon, only one of the Wagtails (the female) was present. It was also evident that the Wagtail proceeded with her task with a certain method. After feeding the Cuckoo until it seemed satisfied, which usually occupied about twenty minutes, she would, on leaving it, fly direct to the grass beneath the perch of the other bird before she began to search for flies. Our first conclusion was that here was a case of two Cuckoos which had been reared together, in spite of the inconvenience with which the two birds would have found space within a nest built to suit the requirements of the smaller bird, and in spite of the instinct which would have impelled each to oust the other from the quarters in which they were both intruders. But, on closer examination, I felt sure that this was not so. The Cuckoos were evidently of different ages. One was considerably wilder than the other, and would not allow of such near approach. This bird evidently was able to feed itself, for I saw it three times drop into the grass from the railing and return to its perch; once with a crane-fly in its beak, which, however, it let fall again. The glass also

showed that its tail-feathers were much nearer their full growth than those of the other bird. I also saw it drive the latter off on one occasion, when it ventured to perch too near. Since I left my friend's house, I have heard that the larger Cuckoo disappeared some days before the smaller, and apparently younger, bird. My own impression is that some accident must have befallen the foster-parents of one of the Cuckoos, probably of the older one; or that they had left it, considering it able to feed itself (as from my observation it evidently was), and that then it had managed to induce the Wagtails to take it under their care in addition to their proper charge. This I imagine would not be difficult, as of course Wagtails are accustomed to rear several young, when they have the luck to escape the visitation of the parasite. It was curious to see the readiness with which the Wagtail would return (generally from the top of the house), and recommence feeding the Cuckoos, if, when they were dozing in the hot sun, we disturbed them, and caused them to begin their cry again. Also, to see how impatiently the older Cuckoo would peck at the Wagtail, and drive it off to forage if she ventured to sit too long by its side, after delivering her bunch of flies into its voracious gape.—W. H. ST. QUINTIN (Scampston, York).

Swallows nesting upon a Hanging Lamp.—A remarkable instance of animal intelligence has lately come under my notice. In a neighbour's bungalow in this district two of our Common House Swallows (*Hirundo javanica*) built their nest, selecting as their site for the purpose the top of a hanging lamp that hangs in the dining-room. As the lamp is either raised or depressed by chains fixed to a central counter-weight, these chains pass over pulleys fixed to a metal disk above, on which the nest was placed. The Swallows evidently saw that if the pulleys were covered with mud, moving the lamp either up or down would destroy the nest; so to avoid this natural result they built over each pulley a little dome, allowing sufficient space, both for wheel and chain, to pass in the hollow so constructed without danger to the nest, which was not only fully constructed, but the young birds were reared without further danger. This is, in my opinion, a wonderful example of adaptation to environment, and showing a step far beyond what may be contended as instinct only.—FREDERICK LEWIS (Ballangoda, Ceylon).

Wigeon nesting in Yorkshire.—It may interest your readers to know that some pinioned Wigeon of mine have nested this year. The nests, of which I found four, each contained seven eggs, and were made in thick brambles, about twenty yards from the water's edge. I have been unlucky in rearing the young, owing to the cold spring.—RALPH P. GALLWEY (Thirkleby Park, Thirsk).

[Wigeon do not breed very freely in confinement. Mr. Seebohm states, in his 'British Birds,' that this species "has bred in a state

of semi-domestication in Ireland, at Lord Sligo's seat"; and in Somersetshire, Mr. Cecil Smith has successfully reared several broods since 1872. On two or three occasions Wigeon have nested at the Zoological Gardens, Regent's Park, and brought up their young. No instance, we believe, is known of this bird breeding in a wild state in England, although the same cannot be said of Scotland and Ireland.—ED.]

Swallows perching on an Angler's Rod.—When fishing for Tench in a private piece of water, about nine miles from Ipswich, a Swallow settled on my rod about half-way up. In an instant another took up a similar position, and then another, so that I had three Swallows perched on my rod at one time, about six feet from the butt. I shouted to a friend, who was fishing opposite to me, to look at the birds; but my voice in no way alarmed them, and they only flew off when I lifted my tackle. I should be glad to know if similar instances have been before recorded.—E. F. BISSHOP (Ipswich).

[Instances of single birds, Kingfishers as well as Swallows, perching on a fishing-rod, have been from time to time reported to us; but we never heard of three birds settling at once on the same rod. The late Mr. Bouverie Goddard informed us that one winter's evening, while sitting quietly in ambush with his gun, waiting for Wildfowl, a White Owl, coming noiselessly along, perched on his slanting gun, but only remained a few seconds before it discovered its mistake, and flew away with a screech.—ED.]

Notes from Breconshire.—An Osprey (*Pandion haliaëtus*) was seen fishing at Llangorse Lake on the 16th August last, and flew to an old post by the side of the lake and leisurely devoured the fish it had caught. It made no stay, however, which is not surprising, seeing the constant firing that takes place on this lake. I saw a magnificent Kite when Grouse shooting on the 12th, but did not molest him. On September 6th I saw a Harrier on the Beacons; I think a Marsh Harrier; but it was so soon lost in the fog that hung over these grand old hills that I had only a very fleeting sight of it. Mr. Crawshay tells me that last August he killed a female Gadwall (*Anas strepera*) on the Usk. This is only the second authenticated instance of the occurrence of this species in the county. The White or Barn Owl is getting very scarce here, but I cannot quite account for it. I had a very light-coloured Grouse brought to me last month as a supposed hybrid between Red Grouse and Black Grouse, both species being found on the ground where it was killed. As this would seriously have disturbed my pet theory that wild bred hybrids never occur, except on the failure of either the cock or hen to find a mate of its own particular species, I sent the leg, wing, and some of the feathers of the bird to Professor Newton, who kindly examined the same, and confirmed my opinion that it was only a very light-coloured Red Grouse. This has been

a great season for Warblers here; I never noticed so many. I myself observed the Lesser Whitethroat for the first time in Breconshire, whilst the Wood Wren was common, and the Willow Wren and Chiffchaff plentiful. This has certainly been an exceptional year for these little visitors, and may in some measure account for the occurrence of the Grasshopper Warbler, which I have heard at least a dozen times; and Captain Swainson took a nest with six eggs, which (the nest and two eggs) are now in the Natural History Museum, Cromwell Road. He also found another nest, with six young ones. This is a welcome addition to the list of Breconshire birds, for neither I nor any of my ornithological friends have ever before heard or observed this shy visitor here.—E. CAMBRIDGE PHILLIPS (The Elms, Brecon, S. Wales).

Abnormal Nesting of the Ringed Plover.—I found this spring, near Wells, a nest containing four eggs of *Charadrius hiaticula*, departing so greatly from the ordinary construction that it may perhaps be worth recording. The depression selected by the bird was on the top of a grassy sea-bank, and was constructed of a comparatively substantial lining of the green fleshy leaves and stems of *Atriplex littoralis*, L. In a long acquaintance with the breeding habits of the Ringed Plover, I never before observed this bird placing a thick layer of vegetable lining in its nest.—H. W. FEILDEN (Wells, Norfolk).

FISHES.

Whitebait.—From investigations made by Professor Ewart and Mr. Matthews (Annual Report of the Fishery Board for Scotland), it seems that Whitebait consists almost entirely, and at all seasons, of young Sprats and young Herrings, which vary in size and in the relative proportions according to the season of the year and the place of capture. From the samples examined it appears that during the winter and spring months Sprats largely predominate. In the Whitebait from the Firth of Forth there are very few young Herring, while in the winter Whitebait found in the London markets Herring only form about 6 per cent., the remainder being Sprats. As the season advances the London Whitebait contain a larger number of Herrings, there being during June and the latter part of May nearly 80 per cent. In July the number of Herrings slightly diminish, and in August Whitebait is composed of about one-half Herrings and one-half Sprats.

MOLLUSCA.

Mollusca of the Skelligs and Valentia.—The Rev. A. H. Delap, on July 29th, had an opportunity of exploring the Great Skellig Island, situated off the Kerry coast, twelve miles out in the Atlantic. The shells which he collected there and sent me are of interest, owing to the locality,

and seem to me worthy of notice. "The Skellig," writes Mr. Delap, "is an immense rock, 800 feet high, very steep and bare, and the water is very deep all round." Referring also to Skellig, when sending some specimens of *H. nemoralis*, he added,—“How they live there beats me; the waves broke a quarter-inch plate glass in the lighthouse, and many of the shells I got were not so high. You will see they are all weathered.” A box of slugs was sent, but most unfortunately parted company with the label in the post, and was never afterwards seen. Mr. Delap writes, however, about them:—“They are, I suppose, the most westerly slugs ever taken in the British Isles.” They included—“*Arion ater*, black, red, and grey; *Limax agrestis*, grey and white; *L. arborum*? well marked, or *L. maximus*, young; and a very small white *Arion*.” The shells, which I have examined, are as follows:—*Hyalina alliaria*, many specimens, nearly all of *viridula* form; some few pale brown. *Helix nemoralis*, yellow, with band-formulæ 1,345, 00000 (12345), and (123)45. *H. rotundata*, all rather flat. *Pupa umbilicata*, pale, and almost edentulate. *Balea perversa*, pale, and of *simplex* form. *Clausilia rugosa*, all somewhat whitened. From this account it appears that the main characteristic of these insular shells is a paucity of colouring-matter; but it may well be imagined that this is rather due to the barrenness of the rock and its bleak aspect than to any other cause. Of other Kerry shells, sent with the above, much might be written; but it must now suffice to mention a few of them. *Hyalina excavata* was sent from Ballycarberry Point on the mainland, while Glanlean Wood on Valentia produced the variety *vitrina*, as well as *Vertigo edentula* in some abundance. *Pupa ringens* (= *anglica*) of typical form was found at Ballycarberry, but Glanlean Wood and Beginnis (an island in Valentia harbour) produced the form *pallida*, Jeff. A curious form of *Arion ater* was sent from Valentia, being rather pale yellowish brown, back and mantle darker; ill-marked brown lateral bands on body and mantle, and faint trace of dorsal band; mantle speckled; fringes pale orange, without the usual dark lineoles. This variety is superficially not much unlike *A. subfuscus*, but is, nevertheless, certainly a form of *ater*. From Beginnis were sent *Vitrina pellucida*, *Hyalina cellaria*, *H. nitidula*, *H. radiatula* type and *viridescens*-*alba*, *H. alliaria* var. *viridula*, *Helix rotundata* and vars. *turtoni* and *alba*, *H. hispida* var., *Pupa ringens* v. *pallida*, *P. marginata* v. *edentula*, *P. umbilicata* and var. *sempronii* (but with microscopical denticle), *Cochlicopa lubrica*, *Pisidium pusillum*, and a very curious little *Hydrobia*, 3 mill. long, pale, with deepish suture, obscure brown marks at intervals on body whorl. This was found with the *Pisidium* in a locality where there was very little water. I am at a loss to identify it with any species known as British hitherto. Of localities on the mainland, Karen Wood (Cahireween) produced *Pisidium pulchellum* and *Cochlicopa lubrica* var. *fusca*; Finney (or Fermoye) Bog contributed *Linnæa truncatula* and

Planorbis spirorbis; and from Killarney lower lake were sent *Limnæa peregra* var. *lacustris*, Leach, *L. palustris*, small var., *L. truncatula* v. *minor*, *Planorbis spirorbis*, *P. parvus* (= *glaber*), *Physa fontinalis*, *Ancylus fluviatilis* v. *albida*, and a pure white form of *Pisidium pusillum*. As an addition to the Tipperary fauna, I may also mention that Mr. Delap has sent a beautiful amber-coloured variety of *Succinea virescens* from near Clonmel.—T. D. A. COCKERELL (Bedford Park, Chiswick).

INSECTS.

Wasps' Nests in Ceylon. — During the dry weather I have been constantly annoyed by wasps building up with mud key-holes, sometimes keys, blank cartridge-cases, and even in one case a pen-holder. As I did not care to have my gun charged with young wasps, I used to empty out any cartridge-case which I found closed up with mud, but one cartridge-case in particular I noticed had been selected. This one I had left on my office table, and each time the wasp closed it up I drew the charge of mud and "grubs," &c.; but as frequently the wasp closed it up again. I may here mention that the wasp used to deposit the egg, and several small grubs in a cell, close over the top, and repeat the operation again till the cartridge was full, when the mouth would be pasted over with a lid of mud. As I repeatedly knocked out the grub and mud, it appears the wasp started a fresh plan. I noticed somewhat to my surprise that the mouth of a cartridge I had but a few hours before emptied was pasted over, so I thought it would be interesting to see how many grubs the wasp had secured in so short a time. I therefore removed the fresh lid, that was still damp, and discovered nothing inside! I am unable to say if this was done to direct my attention to one particular cartridge-case or not, while another spot was being used, but I am inclined to believe such to have been the case, for later I noticed a gap made between two bundles of letters in one of my pigeon-holes, well built up with mud, and, of course, as well packed with grubs.—FREDERICK LEWIS (Ballangodo, Ceylon).

SCIENTIFIC SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

September 1, 1886.—ROBERT M'LACHLAN, Esq., F.R.S., President, in the chair.

The following gentlemen were elected Fellows:—The Rev. Professor Dickson, D.D., of Glasgow University; Mr. P. Cowell, of Liverpool; Mr. A. O. Walker, of Colwyn Bay, North Wales; and Mr. Lyddon Surridge, of Hertford College, Oxford.

The President remarked with regard to the gnats from the Kent Water-works, exhibited at the last meeting, that Professor Westwood had since informed Mr. Douglas that they were only the ordinary *Culex pipiens*.

Mr. Slater exhibited certain parasites found on the body of a larva of *Smerinthus tiliæ*, which Mr. Waterhouse believed to be *Uropoda vejetans*, a species of *Acari*.

Mr. W. Warren exhibited the following Lepidoptera, viz. :—*Eupithecia fraxinata*, caught in Regent's Park; *E. innotata* (Hüb.), bred from *Artemisia maritima*; a variety of *Eupithecia satyrata*; a *Gelechia*, caught in Wicken Fen twenty years ago by Mr. Bond, and believed to be a new species; *G. fumatella* (Dgl.) or *celerella* (Stn.) from Hayling Island; *G. vilella* (Zell.), bred from larvæ collected on the Essex coast on mallow; *Lithocolletis scabiosella* (Dgl.), bred from larvæ found near Croydon; and *Catoptria parvulana* (Wlk.), bred by Mr. Vine, of Brighton, from *Serratula tinctoria*. He also exhibited larvæ of *Gelechia vilella*.

Mr. South exhibited specimens of *Dicrorampha distinctana* (Hein.), and stated that he considered it to be merely a variety or local form of *D. consortana*, from which, in the larval stage, it could not be separated.

Mr. Stevens exhibited a living specimen of *Clerus formicarius*, recently found under the bark of an ash tree in Arundel Park, Sussex.

Mr. Billups exhibited *Chrysis succincta* (Linn.), taken by sweeping at Chobham on the 28th July last. He stated that this very rare species was recorded by Shuckard as having been taken in a sandy lane near Brockenhurst, in the New Forest, and at Blackwater, on the borders of Berks and Hants; and he further stated that the late Mr. Frederick Smith had also taken two specimens of this species in Hampshire. Mr. Billups also exhibited *Microphysa elegantula* (Baer.), taken at Broadstairs, Kent, on the 23rd August last.

The Rev. W. W. Fowler exhibited, on behalf of Mr. Theodore Wood, a larva of *Langelandia anopthalma* (Aubé), a species new to Britain.

Mr. H. Goss exhibited specimens of *Oxygastra Curtisi* (Dale), recently taken near Christchurch, Hants. He stated that he had met with the species in the same locality in 1878, but had never seen it anywhere else in the United Kingdom, nor was he aware of any recent record of its capture. Mr. M'Lachlan observed that the species was taken many years ago in Dorsetshire by the late Mr. Dale, but that he knew of no recent captures except those recorded by Mr. Goss. He also made some remarks as to the distribution of the species on the continent of Europe.

Mr. M'Lachlan exhibited a specimen of *Dilar meridionalis* (Hagen), taken by him in July last in the Pyrénées Orientales; also about 150 examples of the genus *Chrysopa* from the same district, where these insects abounded. Amongst them were *C. vulgaris* (Schneider), *perla* (L.), *Walkeri* (Brauer), *viridana* (Schneider), *tenella* (Schneider), *prasina* (Burm.) and

varieties, *flava* (Scop.), *septempunctata* (Wesm.), *flavifrons* (Brauer), and others not yet fully identified. Mr. M'Lachlan stated that he had obtained about 1500 specimens of Neuroptera in all families during his recent visit to the Pyrenees, which were being prepared for study. He also exhibited a few Coleoptera from the same district, and remarked on the extraordinary abundance of the pretty Lamellicorn, *Hoplia carulea*, which was so common as to give the meadows the appearance of being studded with multitudes of brilliant blue flowers.

Mr. C. O. Waterhouse called attention to the numerous reports, which had lately appeared in the newspapers, of the supposed occurrence of the Hessian Fly (*Cecidomyia destructor*) in Britain, and inquired whether any communication on the subject had reached the Society.

The Rev. W. W. Fowler stated, in reply, that he had been in communication with Miss Ormerod on the subject, and that she had informed him that neither the imago nor larva of the species had been seen, and that the identity of the species rested on the supposed discovery of the pupa.

Mr. A. H. Swinton communicated a paper, entitled "The dances of the Golden Swift." In this paper the author expressed an opinion that the peculiar oscillating flight of the male of this and allied species had the effect of distributing certain odours for the purpose of attracting the females. Mr. Jenner Weir made some remarks on the subject.—H. Goss, *Secretary*.

NOTICES OF NEW BOOKS.

The Badminton Library of Sports and Pastimes. Edited by His Grace the DUKE OF BEAUFORT, K.G. *Shooting.* By LORD WALSLINGHAM and SIR RALPH PAYNE GALLWEY, Bart. With Contributions by Lord Lovat, Lord Charles Kerr, the Hon. Gerald Lascelles, and A. G. Stuart Wortley. Two vols., 8vo, with numerous illustrations. London: Longmans, Green & Co. 1886.

JUST as the naturalists of old, having next to no materials for the purpose, used to sit down in the calmest spirit and with the most remarkable courage to write "general histories" of animals and plants, so in former days did some sportsmen attempt to instruct the world in every branch of shooting, whether they were personally acquainted with the subject or not. In both cases the result was the same—failure; not immediately detected, but sooner or later discovered by the

practical reader who brought personal experience to assist his judgment. The reason why Col. Hawker's work on Shooting was a success and continues to be a standard work to this day is that the author wrote from his own observation on a branch of the subject with which he was intimately acquainted. The result is that his "Instructions to young sportsmen" are still valuable and trustworthy, if due allowance be made for the important alterations and improvements which have been effected in guns and their accessories since the first edition of his book appeared.

The wiser portion of the public nowadays, no longer trusting to general compilations, looks directly to the specialist for instruction upon almost every subject upon which information is required. There can be no question that this is the safest road to learning, and publishers who expect books to pay do well to bear this in mind.

In the case of the two volumes before us the public are not likely to be disappointed, since the publishers have fortunately secured as contributors some of the best authorities in this country on the subjects on which they have consented to write.

Vol. I., devoted to "Field and Covert," commences with an amusing chapter on "Shooting past and present," with particulars of notable "bags," and contains hints for beginners, a short history of gun-making, prices of guns, the choice of a gun, Partridge, Pheasant, and Rabbit-shooting, Pheasant-rearing, Vermin, Keepers, Poaching, Dog-breaking, and Pigeon-shooting.

Vol. II., on "Moor and Marsh," deals with Grouse, Black-game, Deer-stalking, and Deer forests, Woodcock, Snipe, and Wildfowl shooting, Shore-shooting, Punting, Fowling-punts and Swivel-guns, and concludes with a chapter entitled "A little plain law for game-preservers, keepers, and poachers." From this list of contents it will be seen how exhaustively the whole subject of shooting has been dealt with by masters of the craft, who, in advance of all previous writers upon this branch of sport, have produced a work which for the next quarter of a century at least will probably remain the standard text-book.

It would be beyond our province to criticise the technical and valuable hints to shooters which these volumes contain, but, had space permitted, we should have liked to quote some of the remarks on the habits of game and wildfowl as noticed by

the observant authors. For the chapters on Pheasants, Partridges, and Grouse by Lord Walsingham, on Blackgame by Lord Charles Kerr, on Wildfowl by Sir R. P. Gallwey, on Deer by Lord Lovat, and on Rabbits by Mr. Gerald Lascelles, contain almost as much Natural History as details of shooting, and show incontestibly how an attentive observation of the habits of wild animals not only may be combined with the healthful exercise of pursuing them, but how it conduces very materially to the sportsman's success in outwitting them and bringing them to bag.

The many excellent illustrations in both volumes by such good artists as Messrs. Stuart Wortley, Charles Whymper, G. E. Lodge, and others add much to the appearance of the work, and to the utility of the instructions given.

The Inland Revenue Returns for the year ending March 31st, 1886, show that the number of persons in the United Kingdom who took out game-licenses during the previous twelve months amounted to 61,731, not including 4840 more who applied for occasional licenses to cover short periods, and excluding also ten shilling gun-licenses, which were issued to no less a number of persons than 173,000 odd! Assuming that only the holders of game-licenses buy each a copy of the "Badminton" volumes on Shooting (as on principle they should do) it is somewhat alarming to contemplate the increased destruction of game and wildfowl which may be expected to follow; for an improvement in knowledge on the part of shooters will doubtless result in improved "bags," that is, if all the hints for circumventing and outwitting the game be duly committed to memory and put in practice. Fortunately for future prospects, the authors do not confine themselves to giving instructions in the art of *killing*, but very properly deal also with the question of *breeding* and *rearing* game. This is as it should be. In our opinion it will be a bad day for the country when the game laws are abolished and game preserving ceases to be popular. We devoutly trust that the supply of indigenous game, both furred and feathered, may always be found equal to the demand for it, and that it may be always procurable by the manly, health-giving, and pre-eminently English field-sport of Shooting.



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A SIND LAKE.

BY CAPT. E. F. BECHER, R.A., F.Z.S.

SIND, as viewed on the map and as seen from the sea on approaching Karachi, has a most unpromising appearance; in the former case the Desert of Sind is written, and in the latter an apparent desert of deserts is seen, the few houses of Clifton, surrounded by sand-hills, giving a greater aspect of desolation than if no signs of habitation were visible; but along the banks of the Indus which traverses the whole length of Sind are numerous jhils and lakes abounding in wildfowl.

The Manchar Lake, however, though communicating with the Indus, does not owe its existence entirely to that river; it is about seven miles long and four broad; on one side are high barren hills of bare rock, and on the other an open cultivated plain stretching to the Indus, which is distant about eight or nine miles.

The Lake itself is for the most part shallow, and covered with water-weed; the water is like crystal, and, looking down on the subaqueous forest through the clear shallow medium, brightened by the usual unclouded sun, it has always reminded me of a most perfect microscopical illumination of some opaque object, a beauty which a microscopist will understand. The surface of the Lake teems with waterfowl. Mr. A. O. Hume says, with respect to the Coots:—"I believe they would have to be counted not by thousands, but by tens of thousands. . . . In no part of the world have I ever seen such incredible multitudes of Coots as are met with in Sind." This was written in 1873; but since that

date Sind has been opened out, and the Manchar Lake being easily accessible, the number of wildfowl has decreased. On three occasions I have spent about ten days on the Lake. Living in a boat is much preferable to camping on the banks for anyone to whom a bird is something more than a Hawk, Duck, or Snippet.

As an example of what sights gratify one's eyes in the early morning, it was no uncommon thing to see within a stone's-throw of my boat both large and little Cormorants keenly engaged in catching their morning meal, at least two species of Tern every now and then descending with a loud splash into the water, the common Pied Kingfisher hovering over the surface, Stilts, one or two of the numerous graceful White Herons or Egrets, several Black-tailed Godwits; of course one or two of the numerous Harriers which are perpetually sailing over the rushes, and two or three species of the smaller waders; other birds there were, but I think I have quoted enough; within a stone's-throw is no exaggeration; no crouching behind a bush or concealment was necessary on my part; they hardly paid any heed to my presence; on more than one occasion I have seen as many as three White-tailed Eagles together almost within gunshot.

One of the methods of shooting wildfowl when required for the pot, and I am afraid often when not, is to be poled towards the flocks of Duck, and shoot at them sitting on the surface of the water at long ranges; it is remarkable how they seem to know the exact range of an ordinary gun, though a choke-bore at present they do not understand; their almost invariable practice is to let you approach within seventy and eighty yards before they take flight.

On the banks are some fishing villages; great numbers of fish are caught by driving them into a net; this operation is accompanied by the most deafening and prolonged noise; if fish can hear, they would hear this: on the front of each boat is a rocking wooden tray, in which is a copper dekshi; this tray is perpetually worked, varied with beating the deck with a short stick, the boat itself being rocked; a band-conductor, as I may call him, for he seems to regulate the noise and movements, stations himself in a boat at the mouth of the net. It is no uncommon thing for these fishing-boats to have a long perch, on which are seated various species of Herons and Egrets, and Cormorants, or else, perhaps, a Pelican. Mr. Murray says that they use these birds as decoys,

and sew up their eyes; but in the case of those I have examined I am glad to say I have never seen such cruelty perpetrated.

The natives are adepts at spearing fish, which, when the fish are at some little depth, is no easy matter, on account of the refraction; part of the equipment of every boat being two or more spears, and a stone on which to sharpen their points.

I always used to look forward to evening fighting, not only from a sporting point of view, but on account of the varied bird-life which is to be seen on such occasions; the shooting being always from a boat more or less concealed amongst the reeds. I will take from my notes an account of an evening's fighting at the end of February last:—"About 4.30 I took up my position amongst the high reeds. The first to come over were one or two stragglers (Duck), and then the usual enormous flocks of Duck pass by, flying high overhead from the direction of the Indus, the first intimation of their approach being the rushing noise caused by their wings; after this, or perhaps a little before, some large flocks of Glossy Ibis flying slowly in a single undulating line pass close by; one slowly unfolds one of its long legs and leisurely scratches its head, the whole operation appearing very ludicrous; all the time one or two Harriers hunt leisurely over the reeds, ready to pick up any wounded victim to the gun. A Gull or two pass over; especially noticeable is the large Black-headed *Larus ichthyaetus*; then comes a flock of graceful small White Egrets; on one occasion I shot one for identification, which turned out to be *Herodias intermedia*. I also watch with interest the fishing of the Blue Kingfisher, *A. ispida*, and perhaps *A. bengalensis*, and the Pied Kingfisher, *Ceryle rudis*. (I might also have seen the lovely *Halcyon smyrnensis*, but as I am transcribing from my notes on this particular occasion, I did not). Many Wagtails of two or three species flit about the reed-covered surface of the water. The hoarse loud-note of the Pied Warblers, *Acrocephalus stentorius*, is constantly heard, but although close to me, I can only occasionally catch a glimpse of one amongst the reeds. The little Warblers (*Phylloscopus tristis*) flit rapidly in and out amongst the rushes, and, if I do not move, they allow me to admire their ceaseless activity almost within an arm's length. As the evening gets on, the croaking of the Frogs and chirping of the Grasshoppers (?) keep up a perpetual monotonous concert with the splashing and cackling of the noisy Purple Gallinules.

Cormorants, both great and small, fly past (in the case of one I shot, the small Cormorant was *Graculus javanica*, but in Mr. Murray's 'Vertebrates of Sind' I see that both *Graculus sinensis* and *G. javanica* are common Sind species, the former being distinguished from the latter by having *no white thigh or check-patch*; I did not know of this distinction at the time, so was not on the alert to discriminate between the two species). Then I see a few Curlews, a flock of Crows, and flying close to the surface of the water a flock of *Hirundines*; they are gone too quick for identification, but are doubtless *Cotyle sinensis*; and then come the Duck, but I do not see the cloud of them which the previous December used to rise from the Lake as it were simultaneously, passing overhead in varying numbers. In a quarter of an hour or so the flight is over, darkness has set in, and all is still save the croaking frogs and the chirping insects."

I have mentioned above that *Alcedo ispida* and perhaps *A. bengalensis* are to be seen; but I must confess that I am fairly puzzled with *Alcedo ispida*, *A. bengalensis*, and a small form which Mr. Hume says ". . . . compels me to identify it with *ispida* rather than *bengalensis*" (see 'Stray Feathers,' vol. i., p. 168). In no book that I have seen is the difference between *A. bengalensis* and *A. ispida* clearly pointed out. I have four skins of Sind Blue Kingfishers before me as I write: three seem to me almost the same, except that one is not so long, and has the bill a trifle stouter than the other two; these I refer to *ispida*, but the fourth is much smaller and much brighter: its length is 5.75 in.; bill, at top, 1.44 in.; bill, from gape, 1.87 in.; wing, 2.65 in.; the bill is blackish brown, except at the base of the lower mandible, which is reddish beneath; the ground colour of the head is very dark brown; the throat is white and the rest of the under parts ferruginous, but on the breast the ferruginous feathers are tipped with faint light blue; it is a male, and was shot at the Manchar Lake on December 15th, 1885.

As regards Geese and Ducks, on the last occasion I visited the Lake (December 9th, 1885), these and other wildfowl were conspicuous by their absence, and I believe this was the case throughout Sind; on this occasion I saw only a few Grey Lag Geese (*A. cinereus*), and in February of the same year I made no note of this species; but the Barred-head Goose (*A. indicus*) was extremely abundant.

Of the large Whistling Teal (*Dendrocygna ulva*), I shot a few in December, but none in February; they are very slow flyers, and when one of their number is shot, they often circle round it, constantly uttering their whistling cry.

The Ruddy Sheldrake (*Casarca rutila*), more generally known as the Brahminy, is common; its hoarse croak is often heard as it flies overhead. I cannot agree with the statement in Mr. Murray's 'Vertebrates of Sind' that "they are extremely shy and wary birds," and as Mr. Reid, in 'The Game Birds and Wildfowl of India,' remarks, "It will not only keep a sharp look-out on its own account, but will fly along the jhil-side before the gunner, uttering its warning note, and put every bird on the *qui vive*." I have always found it a slow clumsy bird, easy to approach. I was much amused on one occasion watching a Pariah dog trying to approach one in some deep mud; the dog with an unconcerned manner, as if Brahminy Duck was the one thing in this world which it had the least thought of, the Duck as if a dog trying to catch it was an equally distant thought. The dog at last manœuvred till it was quite close, but the Brahminy then flapped away a few paces; the same manœuvres were repeated, to the evident amusement of the bird and the annoyance of the dog; how long the latter would have pursued this wild goose or more correctly wild duck chase I cannot tell, for I was tired before the dog was, and walking on put a stop to more manœuvres. This duck and the last mentioned are considered unfit for human food. A brother officer tried a young Brahminy on one occasion, and ate some of it with relish; he also had a Whistling Teal cooked, which he and another friend pronounced good. I have never eaten the former, but I have attempted to eat a little of the latter; I shall never do so again.

The Shoveller (*Spatula clypeata*) is very numerous; as a bird for the table it also has a bad reputation, which no doubt is frequently well deserved, for it is a foul-feeder, and delights in any dirty pool; but those I tried at the Manchar Lake were not bad eating. The Mallard (*Anas boschas*) was, last December, I think, almost the most numerous species on the Lake; in February I only shot two in about seven days' shooting. The Gadwall (*Chaulelasmus streperus*) is also very common. The Marbled Teal (*Chaulelasmus angustirostris*) very common; when flying, on account of its proportionately large expanse of wings,

it appears a much larger bird than it is. The Pintail (*Dafila acuta*), another very common species. The Wigeon (*Mareca penelope*), not very common; I only shot one last December. Both the Common and Garganey Teal (*Querquedula crecca* and *Q. circia*) are common, especially the latter; none of the males which I shot of the last species during my last December visit had made any attempts to assume the male plumage. The Red-crested Pochard (*Fuligula rufina*) and the Tufted Duck (*F. cristata*) are fairly common, especially the latter; I did not shoot a single one of either of these ducks last December, nor did I observe any, nor did I see any Pochard (*Fuligula ferina*) at that time; I have only a note of it forming part of my bag last February, but whether common or not is not mentioned. The White-eyed Duck (*Fuligula ferina*) is common. At the latter end of the season, when the water has fallen, Snipe are common; and Jack are numerous in favourable places round the edges of the Lake.

On the babal-fringed banks of the canal from Sehman I secured a male and female of *Passer pyrrhonotus*; this is an interesting bird, from having been re-discovered by Mr. Doig in 1880, not having been recorded in India for forty years previously (see 'Stray Feathers,' vol. ix.).

As regards the other animals inhabiting the Lake, which particularly attract notice, amongst the fish there is a freshwater Pipe-fish in considerable numbers; in fact it is almost impossible to look down into the water without seeing several of these gliding in and out amongst the weeds; the natives never catch it. There is also a freshwater Prawn, which to the eye uneducated in entomostracan lore appears similar to the well-known marine form. Mr. Murray informs me that it has not as yet been properly identified.

There are several species of freshwater Mollusca; one, a freshwater Mussel, is very numerous; there is another form of large bivalve, which is unknown to me; *Limnæa*, sp. (?) is also very common, with a pink variety; *Sphærium* sp. (?) fairly numerous; a small *Planorbis* sp. (?) is met with on the weeds, but not in any great numbers; *Paludina* sp. (?) is very common.

As regards the vegetable kingdom, one of the commonest sights is to see a number of women digging up from the mud the roots of the lotus, whose broad leaves cover the water in

places, and afford a convenient standing ground for Snipe, as I found to my cost when working the neighbouring Snipe-ground. These roots seem to be highly prized as a vegetable; I tasted them, and found that they had the flavour of parsnip, but were rather stringy.

NATURAL HISTORY AND SPORT IN THE HIMALAYAS.

BY SURGEON-GENERAL L. C. STEWART, F.Z.S.

(Concluded from p. 409.)

Nakunda, Oct. 14th.—As I did not want to go back to our quarters bird-less, I shot a Grosbeak and a couple of Green Woodpeckers, *G. squamatus*, as we passed through the forest; and had a shot, which I missed, at a Pine Marten. As there were a couple of hours of daylight, Mr. Gomez and Capt. J.'s Shikaree sallied out, and brought in a Flying Squirrel, a Hobby, and a small Sparrowhawk, a male, I believe, but am not sure, of *A. nisus*, but darker than usual for that species; also a Missel Thrush, and a couple of Bullfinches. A hill-man brought for sale a basketful of small fish, netted in a stream midway between this and Koteghur, which we purchased and found not a bad addition to our bill of fare in the evening.

Nakunda, Oct. 15th. — Anxious for another chance at large game, we both devoted the day to exploring the north side of Huttoo, a most fatiguing and unsatisfactory proceeding. We saw nothing to fire at, and no trace of four-footed game, except a Musk Deer, which I missed. Came on Monaul-ground, but saw none. I killed a Chough and T. another, and that was the sum total of our bag for the day. We sent our vassals out for a couple of hours in the evening, but they contributed nothing noteworthy, except a lovely Owl, the second example of *S. newarense* obtained, and a Blue Magpie; but I do not think they were very energetic in their search for birds. We did not think it worth while spinning out more time here, and resolved to make for Koteghur the following day.

Koteghur, Oct. 16th. — I sent one of my swiftest servants off last night back to Simla, with a humble application to my commanding officer for four days' extension of leave, which I may here say was readily granted. Sent the servants, &c., on at day-

break, and followed at mid-day; the distance eleven miles, the road fair most of the way,—passing under Huttoo, and an almost continuous descent,—at first through deodar-forest, then oak, rhododendron, cheer pine, and other trees; and the last few miles somewhat bare, with patches of cultivation in terraces above and below the road. I saw a Buzzard, and tried to get to his blind side, but he made off, without giving me a shot; most likely *B. ferox*. Heard Chicore calling, but, they being a good way off and separated from us by a deep ravine, were not disturbed. The only bird I shot was a Woodpecker, *P. hyperythrus*. Lots of birds observed, but, having specimens of each and all of them, we pressed on to our destination. My Kitmutgar came out some little distance to meet me, and said Mr. Gomez had got into some trouble, and I found the case was this:—He had the assurance to take almost forcible possession of a small house attached to the German Mission at this place, instead of going on to the travellers' bungalow as ordered. All the traps and baggage had been put into the verandah, and fires lighted; and Mr. Gomez had selected the best of the outhouses for himself. The good missionary, Mr. Procknow, on appearing was naturally somewhat scandalized, and ordered him out; but he refused to move, and to obviate a *fracàs* Mr. Procknow consented to waive matters till our arrival. I was bound to apologise and explain how my servant had taken the law into his own hands, and was proceeding at once to reload our coolies and start them for the travellers' bungalow, when the missionary interposed and said if I pleased I might stay where I was, and welcome, for a few days, a proposition I gladly acquiesced in; so that was squared. Mr. Gomez had a bit of my mind, and was apparently penitent. We found our quarters very snug, although the chimneys all smoked, and we made ourselves quite cosy. Mr. Procknow was most kind and considerate, helping me in every way. He had been in these parts for many years, converting and teaching with more or less success. A lot of little hill children about him attended a school attached to the mission, and learned the three R.'s and some other smatterings, under the tuition of another German, a good-humoured little fat man, whose heart I won by some bundles of manillas, and by consenting to hear his pupils go through their facings some day. Mr. Carl was a fair shot, moreover, and Mr. Procknow had a lot of bird-skins, the collection of several years, which he invited me to inspect,

and begged me to label for him, which employment was of mutual accommodation. There was a very good kitchen garden and a fine orchard here, and Mr. Procknow had some flowers. There were all the common vegetables and the hill-fruits, and loads of by far the finest walnuts I ever saw, and now at their best; but what fetched me above everything was a patch of veritable Scotch curly kale. These kind people made me free of their garden and orchard, and I was able in a slight degree to repay them by sending them, when I got back to my regiment, a good supply of the very best English flower and vegetable seeds. My colonel was a great gardener, and had a supply of seeds out from England twice a year; and he willingly gave me as much as I wanted for my host. I also sent Mr. Procknow a small supply of medicines for the use of the "corpora vilia" of his hill-patients, for the gentle missionary was a curer of bodies as well as of souls. I persuaded him to share our rough and ready dinner in the evening, and we had a long chat, chiefly about what was to be shot in the neighbourhood. He mentioned Bears, Ghoral, and occasionally Musk Deer; several kinds of Pheasants, and lots of Chicore. He had seen Tahr brought in from the adjoining heights in winter, and in very severe weather an occasional Serow, *Cervus Aristotelis*.

Koteghur, Oct. 17th.—Devoted the morning and early part of the day to Chicore, and found them numerous in the terraced plots of cultivation, a couple of miles east of Koteghur, especially in the ripe buckwheat crops. We got eight brace, and ought to have shot more. I think our Himalayan Red-legged Partridge, *Caccabis Chukar*, too closely resembles that of Southern Europe to warrant specific separation. It is often kept as a pet by the hill people, generally caged; but I had three of them at Landour as tame as poultry, running about my house, and following me about like a dog. They were most amusing in their way, and aggressive to the native servants, tilting and pecking at their bare legs. They are, moreover, most excellent birds for the table. I have been told of, but never witnessed, a curious mode of making a good bag of Chicore, in vogue with some of the hill Shikarees, and that is by attracting their attention by exhibiting a piece of coloured (usually brown and yellow) chintz or cotton carpet, spread out on the end of a stick, or fashioned like an umbrella. The sportsman holds this out before him, and the birds inquisitively approach within easy shot. My informant

said the birds take this snare for a cat or leopard, and instead of shunning it, as it is their nature to, come so near as to fall victims to their temerity.

In the afternoon one of Mr. P.'s cowherds brought in tidings of a couple of Bears having been seen that morning at the margin of the forest, a couple of miles off; so we went in search of them; a most fatiguing grind it proved it to be, and to no purpose. We saw their spoor, and traces of them in devastated patches of the crimson buckwheat, *Fagopyrum*, then ripe for the sickle; but that was all. This species, *Ursus Thibetanus*, is found all over the Himalayas, and is very destructive to orchards and gardens, consuming the fruit and tearing down the branches. The skins and the "Bear's-grease" are constantly brought into the hill stations for sale by the Paharries; and a well-cured and smoked Bear ham I can testify to be right good eating. After a couple of hours beating about we gave up the search, and retraced our steps down the hill.

On a bare grassy slope I secured a couple of specimens of the Brown Hill Titlark, *Agrodroma sordida*, then new to my collection, but afterwards obtained by me abundantly in the Punjab Salt Range, &c. Got also a brace of the Himalayan Siskin, *Chrysomitris spinoides*; and single examples of *Larvivora cyana*, *Keropia striata*, *Siva strigula*, and *Hemichelidon fuliginosus*; and of each of these birds I likewise afterwards obtained several specimens. *K. striata*, the streaked Jay Thrush, is, notwithstanding Jerdon's statement that it is not found west of Nepaul, by no means rare in the North-west Himalayas, extending to the Dhoon. Its habits are quite Jay-like, and one I examined had its mouth and throat full of egg-shells. The Little Siskin is abundant in these parts, and extends all along the Himalayas; and I have seen them a dozen to twenty together. *Larvivora cyana*, the Blue Woodchat, is not, according to my experience, a common bird in the North-west Himalayas, but of wide range. It is of decided Flycatcher habits, as I watched it constantly returning to its perch with the insect or grub it had made free with. An ally of this bird, *Ianthia cyanura*, the White-breasted Woodchat, is much more common, and a permanent resident in these hills; the other I believe to be a summer visitor only.

My companion took another route, and brought in some Chicore and one or two ordinary Woodpeckers, and a Wall-

creeper, *T. muraria*. He had been lucky enough also to bag a splendid Eagle, *Spizaetus Nipalensis*, a female, with crest three inches long. She was on the look-out for spoil when he was after the Chicore, and kept for a long time just out of range. He brought also a Pine Marten, *M. flavigula*; and one of his coolies killed a beautiful green Viper, *Trigonocephalus*, which Mr. P. told me was common on grassy hill-sides, and dreaded by the natives. He never knew of its bite being fatal to man; but Goats and Calves are often victims.

All the afternoon the fine, albeit somewhat monotonous, flageolet-like note of the Kokla, *Treron spheonurus*, was heard in the woods, but we did not disturb them. It is rather late in the season to find them in the hills, as they are only summer visitants, resorting to the plains in autumn. I may add that next day I shot five pairs of them; preserved some, and kept the others for dinner. This species of Green Pigeon is a great favourite with the natives, on account of its mellow voice, and is constantly to be seen caged. *Treron phænicopterus* has a more extensive range, being found all over Bengal; an allied form, *T. chlorigaster*, representing it in Southern India. The beautiful *T. bicincta* I have never myself found. Several other kinds of Green Pigeon are to be had in different parts of the country, but I only know them from books.

Koteghur, Oct. 18th.—This morning I saw for the first time what appeared to be a new Bunting, feeding in small parties on the hill-slope, mixed up with other little seed-eaters, *E. cia* and *E. fucata*, &c. I fired two barrels of No. 10 into them, and knocked over nine out of the lot, including three of the presumably new Bunting; and I got many more afterwards in this locality. Neither my companion, who had long collected in the hills, nor Mr. P. knew it; so I sent a series for identification to Blyth in Calcutta, suggesting the name *E. leucocephala* if it was new. It was so; and he gave it the name it now bears, *Emberiza Stewarti*. Subsequently I found it at Landour and in the alpine Punjab; and I think I saw it in Scinde in the cold weather. Gould has figured it, in 'Birds of Asia,' as *E. caniceps*; but Blyth's name has the precedence. I saw nothing peculiar in its habits. I have found it in low jungle, as well as on bare hill-sides. The other two Buntings noticed are found all over the hills, and some others occur in the North-west Himalayas, which

I am not sure about, except the black-crested species, *E. Lathamii* or *melanictera*,—a bad name, by the way, as it has no yellow about it, but is all black and chestnut, with a long narrow pointed crest, usually carried erect. I have seen it all over the country, and it is particularly common in the Western Ghats. This morning I obtained specimens of the Himalayan Goldfinch, *Carduelis caniceps*, which is said to breed in the far interior. It is common on the lower ranges in the cold weather, and would seem to be abundant in Cashmere, whence many are brought for sale to the Punjab. It is not so pretty a bird as our own Goldfinch, and has not much of a voice. I once bought a dozen of them at Wuzerabad for a couple of rupees from an Affghan, and kept them in an aviary with a lot of Finches, Buntings, and Munias; a very pretty collection, which I was sorry to part with on having to march away from the station. Another Goldfinch, *C. Burtoni*, is said to occur in this part of the Himalayas, but I never saw it in the flesh. Capt. T. had specimens in his collection, but I forget where he said he had obtained them. I got seven Green Pigeons before breakfast and some more in the afternoon, and several acceptable birds for specimens, among which a pair of *Heterura sylvana*, the Mountain Pipit, pretty common on grassy hill-sides. I never saw it in a wood, as its name would lead one to suppose it haunts.

I next shot a Pipit, *Anthus Richardi* undoubtedly, though I was a long time making it out; I came on five or six of them at the edge of a newly irrigated patch of grain below the Mission House, and saw no others during the excursion. *Turdus atrogularis* is the most common Thrush, only the fully adult male has the black throat and breast; the young have these parts grey, with dusky streaks. *Turdus viscivorus*, certainly the British Missel Thrush, loves the forest, and is to be found both in the pine-clad declivities, where I got it to-day, and in rhododendron, dwarf oak, or ringall bamboo thickets. I also got *Merula bouboul*, the Grey-winged Thrush; fully adult birds are jet-black, with a large grey wing patch; the bird of the year is brownish, and the wing fulvous; some young birds have the throat reddish, and the same tint in spots on the black breast and belly. This Thrush is a charming songster; its note is the most melodious among all the sweet songsters of these hills, and it is prized accordingly. I have on several occasions taken its nest,—a massive cup built of moss

and ferns, usually placed not very far up a middle-sized tree. The eggs, four or five, are greenish, with reddish markings in spots and streaks. The only other Thrush observed at Koteghur was *M. castanea*, in pairs as yet, but apt to pack by the dozen or score during the winter.

Got male and female of a Rose Finch to-day, after a lot of dodging, they being very shy and restless; they were in a low oak thicket up the hill. I make them out to be *C. erythrinus*, rather on negative than positive grounds. It is, I think, the bird so often caged by the natives on account of its pleasing but weak little ditty. I never got it on the hills before; but there are several other handsome Rose Finches, which are, to me, at least somewhat puzzling, from the descriptions to which I have access, and from seasonal and sexual differences of plumage; and I thought the stuffed specimens in the Calcutta Museum additionally mystifying, these dummies having suffered and changed much in appearance, the result of time and exposure to light and climate. Another little Finch, procured for the first time to-day, is *Metoponiâ pusilla*. I met with several small parties of them, tearing out the flowerets of a species of *Artemisia*. Some of the examples of this neat little bird, shot during the trip, had no red on the poll,—young birds of the year, I presume; others had but faint traces of the yellow on the wing, and the breast and back concolorous. Indeed, how the bird from its various phases of plumage, dependent on age and sex, has escaped being multiplied into several species, in these days, is a marvel to me. Mr. P. had a fine series of them, and showed me several as distinct species. He told me, moreover, that he knew the bird well in Germany; but I think he referred to the Redpoll. I once saw a flock of this bird at Rajpore, the foot of the Mussoorie range. It was in a very severe winter, and snow was on the ground at the time. The only Stonechat I observed here was *Pratincola ferrea*, which is common enough, and ranges all over the Himalayas; and I procured no example of any kind of Wheatear. Two kinds of Bul-bul are common, *Pycnonotus leucogenys* and *P. pygmæus*; the former abundant at about 4000 feet, the latter less so. A very common bird observed is *Saroglossa spiloptera*, usually classed with the Starlings, although I did not see much in its habits to induce me to think so. It is quite arboreal, and eats more of berries than insects. It spends the hot weather in

the middle ranges, up to about 5000 to 6000 feet, arriving early in May to breed. It lays its pale bluish green eggs, speckled darker, in holes of trees, also in banks, on a pad of leaves and fine roots or twigs. The only Mynah I saw was *A. tristis*; but there were examples of *A. fuscus* in Mr. P.'s collection, obtained on the spot.

This evening I saw a considerable flock of large Swifts, most likely *C. melba*, flying about and screaming, as if they meditated migration. They were quite out of shot. *C. affinis* is common here, but I observed it nowhere else during our trip, and no other true Swift. I had rather a good day of it, and may record the more noteworthy acquisitions. *Hemichelidon fuliginosa*, the Dusky Flycatcher, a pair; not a common species. *Muscicapula superciliaris*, a pretty little Flycatcher, figured by Jerdon in his 'Illustrations'; common all over the West Himalayas, and I believe in the Nilgherries; and I once got it in the cold weather in the neighbourhood of Allahabad! *Stoporala melanops*, the Verditer Flycatcher, a common species, which I think attains a higher elevation than other Flycatchers. I have noted it at over 10,000 feet. I saw a dozen of these birds to-day, and several of the pretty *Myiagra cærulea*. Both species breed on the hills. I got a single specimen of another rare Flycatcher, *Erythrosteria acornus*, for the identification of which I am indebted to Major Hutton.

The Paradise Flycatcher, Mr. P. informs me, is occasionally found at Koteghur, and he showed me its nest, which he had found in his orchard,—a beautiful deep cup, worked up with fine grass-stems, and thickly coated with cobwebs; the eggs are cream-coloured, freckled and blotched with claret.* *Cryptolopha cinereocapilla*, seen all along our route; common at Kussowlie, &c., visiting the Dhoon in winter. I think it is to this little bird that the beautiful nest belongs, described somewhere by Hutton as being like a watch-pocket built of moss, and fixed against the trunk of a tree.

I saw three kinds of Laughing Thrush to-day, and mention them in the order I found them most prevalent:—(1) *G. albigularis*, (2) *G. leucolophus*, (3) *G. variegatus*, which last is somewhat rare, and I think affects the higher mountains, and

* I possess nests of this bird shaped like an inverted cone or prolonged into a stalk like a sherry-glass.

is never found in the warm valleys, like other species of Laughing Thrush. During our trip I secured specimens also of *G. erythrocephalus* and of *G. lineatus*, which last is the most common species of all, but is usually found in pairs only, differing thus from its congeners, which are always, as far as I have seen, found in small parties of five or seven to flocks of fifteen to twenty, noisy and irrepressible. I have seen the nests of all these species, and they lay beautiful glossy greenish blue eggs. I possess now a pretty nest of *G. erythrocephalus*, marked, "May 22nd, 1861, Mussoorie,"—a large perfect cup formed of oak leaves, *Q. incana*, with some sprigs of fine fern, grass and moss, and lined entirely with very fine grass. It was placed within reach of my hand in a thick berberry bush, and contained three beautiful pale blue eggs, faintly spotted with rosy red. But the best bird I got to-day was my first example of *Sitta leucopsis*, the White-eyed Nuthatch, and I never got more than two or three afterwards. A pair were clambering about a hazel tree; I secured one, and tried in vain to get the other, which was by no means shy; indeed I could not get far enough away to enable me to secure it without blowing it to pieces, and the undergrowth was to an exasperating degree thick and thorny, so my progress was slow, and the bird disappeared.

Engaged part of the afternoon arranging the spoils of the last few days, and afterwards overhauled Mr. P.'s collection, from which he kindly permitted me to take pickings. Among other good things thus acquired were specimens of the beautiful *Grandala cælicolor*, a bird I did not myself shoot for many years afterwards, and of *Ibidorhynchus Struthersi*, the Pied Curlew. Both these, Mr. P. says, are strictly mountaineers, and only got several marches in near the snow. I have since, however, been told that this Curlew occasionally does come lower in severe winters. Mr. P.'s bird-stuffer unfortunately was not very skilful; nearly all his birds had their necks provokingly elongated, and from inadequate poisoning a good many of them were going, or had gone, bad. I made Mr. Gomez give the man a few lessons; and some contributions which Mr. P. afterwards kindly sent me had been in every respect well prepared. I must not omit mentioning that the collection I examined contained several examples of the lovely *Nectarinia Gouldiæ*, which I reckon is a rare species in the North-west Himalayas. There were three males and a presumed female; they had all been shot in the

orchard close to the Mission House. The only other Sunbird noted was the purple one, *N. Asiatica*, which would seem to be common at Koteghur and in the warm valleys. *Passer cinnameus*, the Cinnamon Sparrow, is, I find, particularly abundant hereabouts, quite taking the place of the domestic one, and freely entering the verandahs. Elsewhere I have only noticed it in trees. It is a pretty bird, at least the male is; the female being paler brown, without a trace of the bright rufous of her mate. I have found this Sparrow's nest at Kussowlie the end of April,—an untidy structure of grass and feathers, mixed up with scraps of paper, wedged into the fork of a decayed andromeda tree. The eggs, five in number, seemed precisely like the Common Sparrow's. The only other representative of the family I have myself obtained in India is the yellow-necked *P. flavicollis*, common in the sub-Himalayas; and I have also shot it in the Rajmahl Hills.

This evening, as I was coming in from a fruitless search for Chicore, I almost stumbled on a Fox at a turn of the path, close to the Mission House, and by a lucky snap-shot bowled him over. Mr. P. was glad to see this marauder hanging by the heels in the verandah next morning, as his poultry yard had of late been somewhat thinned by some nocturnal visitor. There is a caged specimen here, belonging to one of the servants, of a Thrush, *Geocichla unicolor*, a fine songster, and not very rare up to 5000 feet. *G. citrina*, a handsome species, is abundant at the foot of the hills in winter, visiting the middle ranges, where I infer it breeds about April.

Koteghur, Oct. 19th.—Having sent on breakfast materials and our ponies to Komarsen, a hill village four miles off, we left Koteghur at daylight. A descent of two miles brought us to a beautiful stream, which we had to ford, as the little bridge was under repair. Luckily our coolies had not got farther on the road; so after devoting an hour to exploring the thick underwood, I had a bathe in the stream, and then to breakfast. I shot a small Otter, and we sighted a big one in the afternoon. We got nothing new, and nothing of particular interest. The best birds secured were *Zoothera monticola*, *Cinclus Pallasii*, *Henicurus maculatus*, *Ruticilla leucocephala*, *R. fuliginosa*, *Myiophonus Temmincki*, and *Turdus viscivorus*. *Siva strigula* was common in the more open part of the coppices; and there were the usual species of

Parus found all over the mountains, often associated with the Tree-creepers and Nuthatches, and a Woodpecker, generally *P. brunnifrons*. It was very hot, and the flies were exceedingly troublesome, so we made our way back to Koteghur early in the afternoon. Before dinner I strolled out in search of nothing in particular, and was lucky enough to bag a brace of Cheere Pheasants, *Phasianus Wallichii*, out of a family party of seven or eight. They were feeding in a patch of cultivation close to the forest below the road; the rest of the covey ran into the wood. My spoils were an old cock in perfect plumage, and a young bird not worth preserving, but excellent on the table next day. This fine species, a true Pheasant, frequents the lower and middle ranges, and is said to be partial to certain localities, year after year, and not to wander much from them. I have seen them close to villages, and they love grassy hill-sides, with or without brushwood, or patches of the dwarf bamboo, and the like. They run off at a great pace when disturbed, and then lie close; and a good dog is of great service in finding them. Vast numbers of the Slaty-headed Parrakeet, *P. schisticeps*, in parties of thirty to fifty, flying about previous to roosting in the forest for the night. I observe that the young bird has the head concolorous, with the back and the tail but slightly tinged with yellow or blue, and that the wing-spot is not developed till the second year.

The only Vulture I have noticed here is *Gyps fulvus*, which is a noble looking bird on the wing. It breeds on the shelves of precipitous mountain cliffs. There is a small colony of them on "Tapp's Nose," at Kussowlie, who increase and multiply in winter. I fired three green cartridges at one this evening, but failed to bring him to book. I have found the best mode of obtaining Vultures and Eagles is by a bait of flesh charged with strychnine. Capt. T. brought in a Ghoral and a brace of Wood Partridges, but no birds to add to the collection, except a fine Buzzard, *B. canescens* of Hodgson, I believe.

Koteghur, Oct. 20th.—I had left Mr. Gomez and his man busy at work with the birds when we retired last night, and this morning, when I proceeded to examine his work, he informed me, with well simulated anguish, that the rats must have made off with all the birds he meant to have skinned before going to bed. Something in his manner made me suspicious that he was a clumsy liar, and he could not stand cross-examination. After

much declamation and prevarication he suddenly, as if by a sudden inspiration, turned half about, and lifted a couple of the boards forming the floor of the hut:—"Look sir, where the cursed rats have taken your birds." There they were sure enough, about a dozen in number, laid out in accurate line one beside another, without a feather ruffled. Mr. Gomez for some time lied stoutly, and denied all knowledge as to how the birds had come there, unless walked off by the rats; but doubtless he had put them there himself to escape the trouble of preparing them, and was fool enough to persuade himself that I would believe his story; of course he ended the drama by weeping. I let him off the beating he deserved, but locked him into the hut, and did not release him till all the specimens had been preserved. The rat referred to is not the common *M. decumanus*, but *M. niveiventer* (of Hodgson, I think); at all events it is the Common House Rat of these parts; rather a pretty creature, and not an *horresco referrens* brute, like its brown cousin. It is said to live entirely on grain, and to eschew flesh. I fancy, however, it goes in for anything it can lay hands on.

In consequence of this little episode with my follower, I did not go out till after breakfast. I was surprised to get an example of the beautiful Blue-breasted Bee-eater, *Alcedo coruscans*. It is common in the sub-Himalayan forests, but I never before saw it in the mountains. I met with no other kind of Bee-eater during this trip; and I only saw one Roller, *Coracias Indica*, and that was near Sabathoo, at an elevation of 4000 feet. Shot a pair of the Great Barbet, *Megalaima virens*. This fine species, the largest of its kind in India, is of common occurrence in the mountains, but does not, as far as I have observed, go below 4000 feet. I once got its nest at Mussoorie, the end of May, in a hole in the main trunk of a rhododendron, about twelve feet up, containing three glossless white eggs. A pair of these birds, which were brought to me from the nest, became perfectly tame, and lived with me several months. I used to let them out of their cage, taking the precaution of closing doors and windows. They used to perch on the tines of a stag's head on the wall, whence they held forth their loud and monotonous three-syllabled call. There is no difference in the plumage of the sexes. I fed them entirely on fruit, and over-fed them I doubt not. They used to eat till they could literally hold no more; and when they got to

this stage would sit motionless with a bit of plantain or other fruit held fast in their bills. One of them perished in a fit; the other, I believe, was injured by my servant, as I found it lying on the floor moribund, after having been chased about the room by the stupid lout in his attempts to capture it and replace it in the cage.

I got a fine *Spilornis cheela*, the Crested Serpent Eagle, this morning, and ought to have secured another, but fired the wrong barrel, which was charged with dust-shot. This is a very handsome bird, common on the plains as well as on the hills, where it breeds in April. Is said to be very destructive to poultry and pigeons. The best bird obtained to-day was the first specimen I ever got in India of *Regulus cristatus*. As I was not sure of it I sent it to Calcutta for identification, and Blyth, who had not got it before, showed his appreciation of it by keeping the specimen for the Museum. I believe he at first considered it distinct from the British Goldcrest, and named it *R. Himalayanus*, but subsequently held it to be identical. Jerdon, too, believed them to be distinct. It is a rare bird. Another acceptable acquisition, and also the first I had ever seen, was *Pnoëpaga squamata*, the smaller Hill Wren. Being a little bird of skulking habits, it is seldom seen. I had no idea what it was, till after I had retrieved it from the tangled thorny jungle into which it had dropped. I got five species of Titmouse to-day, viz., *Parus cinereus*, *P. xanthogenys*, *P. monticolus*, *P. melanolophus*, and *P. erythrocephalus*. Of these the first-named is the most generally distributed. I have found it all over the North-west Himalayas, from Murree to Mussoorie, on the Western Ghats, and on the Nilgherries. The others are all about equally common, and several species may often be seen on the same tree insect hunting; and the busy assemblage is constantly associated with other Insectivoræ, such as *Certhia*, *Sitta*, and *Dendrophila*, and one or two kinds of small Woodpecker. Besides these Pari of the West Himalayas, there is *P. rufo-nuchalis*, whereof Jerdon thus remarks:—"The Simla Black Tit was procured by Hutton near Simla, high up towards the snow-line." As a matter of fact, Hutton's specimens were procured by me on the top of Nagteeba, a mountain a couple of long marches beyond Landour, in March, 1861, and given to Hutton in exchange for some pickings from his collection.

I kept a pair for myself, and meant to have sent them to Calcutta, believing them to be new; but they unaccountably disappeared with some of my rarest skins, and I have no doubt they were purloined by an ungrateful scoundrel of a soldier, whom I employed as half-servant, half-orderly. This man had a good knowledge of Himalayan birds, at least as regards their rarity and value; and having been at the Sanitarium for a couple of seasons he had a fair collection of his own, which he purposed taking to England for sale, as he was about to be invalided. After he left Landour, I missed some of my best birds, to which he used to have free access. Among these were the only example I then possessed of the Black-backed Woodpecker, *Chrysocolaptes Goensis*; the Himalayan Crossbill, the only one I ever obtained; *Eurylaimus Dalhousiæ*, *Nectarinia Gouldiæ*, and *N. Horsfieldii*.

I made a lucky shot this afternoon, and knocked over a fine black Eagle as it swept past me. This proved to be *Neopus Malaiensis*, a female. It is described and figured by Hodgson, in 'Journal Asiatic Society,' No. 134, 1843, under another name, which I forget. It is remarkable for the conformation of the foot, whereof the inner toe is remarkably large and stout, and the outer small and weak. I saw several of these Eagles during our trip, but only got this one. It is readily recognised in flight by its very dusky, almost black, colour, and its immense alar expanse. Hodgson says it subsists mainly on birds' eggs. The stomach of my bird to-day contained only the remains of a small Monitor Lizard, *Varanus*, but no vestige of an egg. I was surprised to get to-day an example of the Cuckoo Shrike, *Campephaga fimbriata*, rather a scarce bird, but of wide distribution, for I have shot it in the Calcutta Botanical Gardens, at Secundrabad, and at Mahableswur; and here it turns up in the far Himalayas. An allied species, *C. Sykesii*, is distinguished by its smaller size and black head; and it is also of wide distribution.

I had a ramble in the forest in the afternoon, avoiding the denser portions, which few birds seem to resort to. Among other species obtained and noted were *Oreocincla mollissima*, *Merula Wardii*, *Geocichla citrina*, *Petrocincla erythrogastra*, *P. cinclorhyncha*, and *Turdus atrigularis* being all Thrushes. Of Woodpeckers *Gecinus occipitalis*, *G. squamatus*, *Picus Himalayanus*, *P. brunnifrons*, *P. pygmæus*, and I thought I saw

the Chesnut Woodpecker, *Micropternus phaiiceps* fly past. Of most of these I had plenty specimens at home, so I did not fire at them. Saw two or three small parties of the beautiful Lesser Minivet, *Pericrocotus brevirostris*, the males and females apart. These birds leave for the plains in October, breeding on the hills in June. Mr. P. says they are very common. The large species, *P. speciosus*, he does not appear to have recognised, but it is occasionally seen at Kussowlie, and is common in the Dhoon in winter. After a couple of hours pretty hard fagging, for the ascent was steep and the way rugged, I sat down to have a smoke, thereby missing a chance at a party of Cheere Pheasants which came into the open to feed, and ran in all directions back to cover when they observed me. Capt. T. had better luck; he went off at daybreak; and on my rejoining him in the afternoon I found him arranging his spoils, which consisted of a Ghoral, three Cheere, two brace of Wood Partridge, and a Chicore. He had seen a Kakur, or Barking Deer, but could not get a shot, so impervious was the jungle. The only bird to add to the collection was a noble Horned Owl, *Bubo bengalensis*, which he flushed when beating for Wood Partridge. Mr. P. informs me this Owl is not rare about Koteghur in summer, and his collection contained several specimens. I did not at the time know that it was obtainable off the plains. Capt. T. said he had seen a pair of large very dark Eagles questing the face of a deep ravine,—most likely *N. malaiensis*.

Koteghur, Oct. 21st.—I find the Himalayan Tree Pie, *Dendrocitta sinensis*, is very common hereabouts. You get him at about 5000 feet elevation, but I have not seen him much above that; at higher altitudes the beautiful Blue Pie replaces him; and in the sub-Himalayan forests and the plains generally you get the red species, *D. rufa* or *vagabunda*, of some writers. A deluded acquaintance of mine once put a young *D. sinensis* into his aviary, which held no end of small dicky-birds; but it was not a success, as far as their fraternising went: the Pie killed half of them the first day, beginning with some Java Sparrows and Munias, daintily eating their heads off first. I did not go far from our quarters to-day, but managed to pick up some rather scarce birds, besides a few Chicore. Flocks of the Lark Finch, *Fringilauda nemoricola*, have made their appearance, and will be still more abundant as the cold season advances. I have seen

them on the mess-table under the name of "Ortolan," which in India means any small brown seed-eating bird,—Lark, Finch, Bunting, &c. I got enough specimens this morning with one discharge of No. 10 shot. Shot a pair of either sex of a curious-looking Woodchat, which I find to be *Muscisylvia leucura*, and I got several more during the remainder of my leave. This bird frequents jungle of dwarf bamboo, raspberry, &c. Habits quite those of a Flycatcher; the note a harsh creaking, the male and female answering one another with remarkable punctuality, as I observed. Small beetles only found in the stomachs of five specimens I opened. *Pratincola ferrea* is more common here than I have ever found it. I have kept this bird in a cage, and love it for its sweet little song; and I once brought up a small family of them from the nest, and found them sprightly pleasing birds. Got a beautiful pair of *Pteruthius erythropterus*, and several specimens each of Bullfinch, Siskin, and Goldfinch; also single examples of *Siphia strophciata*, *Muscicapula superciliaris*, *Campephaga fimbriata*, and a lovely Nightjar, *C. albonotatus*, the last example of which I had was flushed in the Botanical Gardens at Calcutta; so this species has a pretty wide range. *C. indicus* and *C. monticolus* also extend to the Himalayas. I had some practice with indifferent success at the small Crag Martins, *Cotyle rupestris*, which in the evening came about the bungalow. I only secured one, but I got several afterwards. These little birds do not nidificate in banks, but affix their little clay-constructed nests to the face of crags, or the crevices betwixt rocks.

Another species of this form of Martin, *C. concolor*, is common in many parts of the country, nowhere more so than in the Western Ghats; and till I found it at Poorundhur, on the Bombay side, I thought it was entirely restricted to the plains. *C. sinensis* is universally spread and particularly abundant on the large rivers, whose banks, when of any height, are honeycombed with their nests. I once nearly lost my life when engaged in exploring a colony of these birds on the banks of the Ganges; the alluvial bank on which I stood gave way under my feet; and if I had not caught at some thick reeds I should have gone under to a certainty, and with but a poor chance of emerging, as the river was racing, and there were eddies and under-currents beneath me. In the evening a hill man brought in a few birds

for my acceptance, which of course I purchased. The only one worth much was a great black and white Kingfisher, *Ceryle guttata*, a fine species, with a flowing crest. It is to be found on all the considerable waters of the interior.

Koteghur, Oct. 22nd.—Had a last day among the Chicore, but made a poor bag; only five brace and a half to our two guns. The birds are wild, unless in the early morning; so we gave up shooting at 11 o'clock. I shot a fine Bonelli's Eagle on the way back, and another *Spilornis cheela*; saw also a black Eagle, *Neopus*, but not approachable. As this was our last day here, I looked out for varieties only; got five of *Emberiza Stewarti* at two shots, within fifty paces of the door. I borrowed a barn sieve from Mr. Procknow, and made the usual trap with a prop and long string, and got one of my people to poach for little birds with it. I got some Cinnamon Sparrows, two kinds of Bunting, *E. cia* and *E. fucata*, besides the new kind. I tried this plan again on several occasions with great success. We entertained the excellent missionary at dinner, giving him the best available cheer; and I was quite sorry to say adieu to him to-night. He kindly posted a couple of ponies for me, and I sent my own nag on to Mutteeana. We left Koteghur before dawn, and got to Nakunda in time for a hasty breakfast; after which we took the route for the locality where we got our first Monaul on the 10th. We fagged hard till well on in the day; I got four, only one good cock among them. T. got a brace, and we lost a brace.

Descending the mountain towards Mutteeana, I diverged a bit at Oosrao's suggestion, and was lucky enough to come on three Ghoral, and got one; and within a mile of home saw another, which I missed. Capt. T. shot a brace of Cheere Pheasants and a beautiful Crested Eagle. I saw a small flock of the White-backed Pigeon, *C. leuconota*, but exceedingly wild; and the only thing worth preserving, barring the Monaul, that I got, was a fine Hobby. It was in the act of devouring a Lark when shot.

Fagoo, Oct. 23rd.—As my time, even with a few days extension of leave, is very limited, I have been pushing on. I got here at mid-day from Mutteeana, riding on ahead of servants and baggage, but having sent on a gun to this place, as I was anxious to beat the woods, and look out for game as well as specimens. I had tolerable luck, bagging a Kakur, or Barking Deer, and a brace

of Cheere; and egregiously missing several easy shots, for my hand was not steady, and I was somewhat fagged after a long ride, the last six miles on a beastly native saddle, and that on a Bazaaur Pony. Capt. T. got three Wood Partridges.

We stopped our beat about 4 o'clock, and I devoted the remaining hours of daylight to a quiet stroll in the immediate vicinity of the bungalow, adding to my collection examples of the following species, but of course seeing many others:—*Caprimulgus monticolus*, *Gecinus flavinucha*, *Keropia striata*, *Pomatorhinus leucogaster*, *Cinclus Pallasii*, *Oreocincla mollissima*, *Merula Wardii*, *Ixulus flavicollis*, *Megalaima virens*, *Ruticilla cæruleocephala*, *Stachyris pyrrhops*, *Carduelis caniceps*, and *Pyrrhula erythrocephala*. I left all these for Mr. Gomez to prepare on his arrival in the morning.

Kussowlie, Oct. 24th.—I left Fagoo for Mahassoo yesterday morning, walking in to breakfast, and sending on my pony half-way to Simla; breakfasted at Capt. H.'s bungalow, and then on leisurely. I had very little ammunition, and had to economise it, so I only bagged the most tempting species. I got another Crested Eagle close to Fagoo, *S. nipalensis*, and missed a beautiful *A. Bonelli*. I reached Simla in the afternoon, dined and slept at Rockbank, and having sent what ponies I could borrow or hire to the different stages *en route*, left at noon, and got to Kussowlie, taking it easy, in time for dinner.

Thus ended a most delightful trip in glorious weather, and in some of the most beautiful scenery in the world. I had much better sport than I anticipated, and had, it must be admitted, great luck. I also did fairly well from an ornithological point of view. I got *one* new species, and added specimens of at least a dozen more new to my collection; and I got many specimens of rare and interesting forms, whereof I only before possessed poor representatives.

SUPPLEMENTARY REMARKS ON THE MOLLUSCA OF PONTEFRACT AND NEIGHBOURHOOD.

By GEORGE ROBERTS

SINCE the original list of Pontefract Mollusca, which appeared in 'The Zoologist' for November and December, 1885 (pp. 423—429; 470—475), was compiled, the following additional

species and varieties have been discovered. A few new localities for species and varieties mentioned in the former list have also been added :—

AQUATIC MOLLUSCA.

LAMELLIBRANCHIATA.

Fam. SPHÆRIDÆ.

Sphærium ovale, Fer.—The station mentioned for this scarce species in my previous list (Zool. p. 471) has been searched this year, but none could be found. It has, however, turned up in the Barnsley Canal at Heath, a few miles nearer Wakefield. Three specimens were obtained on Sept. 2nd of the present year.

Pisidium fontinale, Drap., var. *Henslowana*.—River Went (J. Hebden). Omitted from my former list.

PULMONOBRANCHIATA.

Fam. LIMNEIDÆ.

Planorbis complanatus, Linn., var. — On September 16th of this year I found several specimens of *P. complanatus* with the keel very obtuse, along with specimens of the type with a sharp keel. The variety is horn-colour, large, and covered with Confervæ; the type is of a clear reddish brown, and not covered with Confervæ. They all occurred near Milford, and were intermixed in one dyke. Our *complanatus* here, both type and variety, are, as before mentioned, very concave on both sides, though the species is described in books as being flat or flattish on the under side; Tate says, “convex.”

P. fontinale var. *pulchella*.—Milford, on caddis-cases.

Bythinia tentaculata, L., monst. *scalariforme*. — Near Milford Junction Railway-station. New to Britain.

Physa fontinalis, Linn., var. *curta*, Jeff. — Milford Junction, on caddis-cases.

Limnæa peregra, Mull., var. *ovata*, subvar. *nitida* of Zieg.—Spine short; mouth expanded, shining. Ditches at Methley.

L. peregra var. *candida*.—Milford, one specimen.

L. stagnalis, Linn. — In May of this year I found a single dead shell near Milford (amongst mud which had been thrown from a ditch), which, from the appearance of the reflected outer lip, was full grown, though only measuring in length 20 mill., and in breadth 9 mill. Mr. Cockerell, of Chiswick, who has the shell, states that it is much smaller than the varieties *minor*

described by Locard and Kobelt, and suggests that *minima* would be an appropriate varietal name, if other adult forms have been or should be found of the same size. The full normal size of *L. stagnalis* is about 54 mill. in length, and 28—30 mill. in breadth.

L. truncatula, Mull., var. *elegans*.—In a small rill at Carlton, near Pontefract.

L. truncatula var. *minor*.—Methley, three or four specimens.

TERRESTRIAL MOLLUSCA.

GASTROPODA.

Fam. LIMACIDÆ.

Arion hortensis, Fer., var. *grisea*.—Ledstone and Went Wood.

A. hortensis var. — In a bed of nettles near Pontefract, on limestone, I found specimens of *A. hortensis* which appeared very different from our ordinary sandstone varieties. There were two forms, the descriptions of which from my note-book made at the time are as follows :—(1) Body broad, of a primrose-yellow colour; the colour strongest on the fore part of the shield and the tail; no lateral stripes; tentacles brown; respiratory orifice minute. (2) Body narrow, orange-brown; lateral stripes dark; a narrow dark brown border round the shield; tentacles bluish black. This variety, when confined in a box, fed on another dead *Arion*, though it was surrounded by vegetable matter of various kinds.

Limax maximus, Linn., var. *cellarius*.—A common form.

L. agrestis, Linn., var. *sylvaticus*.—Very common form.

Fam. HELICIDÆ.

Succinia pfeifferi var. *minor*, Rossm. — Pond close to the railway, about a quarter of a mile east of Milford Junction.

S. elegans var. *minor*, Jeff.—With the above.

Helix aculeata, Mull.—Went Wood, June, 1886.

H. nemoralis var. *albinus*. — Shell white, 00000 and 12345. Milford.

Var. *albolabiata* + *citrinozonata*.—Pontefract.

Var. *petiveria*, Moq.—Pontefract, frequent.

Var. *olivacea*, Goss.—One specimen, bright olive-brown, with one brown band, and one white band beneath. Most specimens of this variety are bandless.

Var. *rubella*, Moq.—New formula, 00345. Pontefract.

Var. *hyalozonata*, Taylor.—One specimen in Bondgate, Pontefract.

H. hortensis var. *subalbida*, Locard. — Five or six specimens all close together in a ditch near Ledstone, on the sandstone, about two miles from Castleford. Shell white, slightly tinged with pale yellow near the mouth; thin and glossy. I have not yet noticed any *hortensis* on the limestone on the east side of Pontefract. The type occurs at Featherstone, another place just on the edge of the sandstone, about half a mile west of the limestone.

H. cantiana. — This species and *H. virgata* seem to be less affected by the weather than some others. On September 16th, 1866, a warm dry day, I found *H. cantiana* and *H. virgata* in all stages of growth attached to the vegetation in hundreds on the roadsides near Ferry Bridge and Pontefract; but I noticed no *H. nemoralis*, and very few *H. arbustorum*, species which are abundant on wet days. In Ferry Bridge Lane, about a mile from Pontefract, there is a horse-trough set in a high bank. Whilst resting here a short time on the above date, sitting on the edge of the trough I observed a *H. cantiana* creeping at the bottom of the water, which was about nine inches deep. It kept constantly raising its head, as if seeking for some means of escape. I sat about a quarter of an hour picking the ripe dewberries which overhung the trough, and it remained creeping about all that time. There was another *cantiana* and one *H. caperata* creeping up the wet mossy side of the trough. I took the *caperata*, which was a fine one, but left the *cantiana* to join his friend at the bottom of the trough.

H. rufescens. — Many depressed forms near Featherstone, which may be var. *depressa* of Locard. J. Wilcock found two specimens with spine (apex) somewhat lower than the outer whorls, otherwise they were much like *H. obvoluta*.

Var. *rubens*, Moq.—Wentbridge and Ledstone, among nettles.

H. concinna. — Milford and Featherstone. The form which we are now calling *concinna* is sometimes sparingly hispid and sometimes bald. It is not so flat, nor so wide in the umbilicus as some that I have from Monsaldale. I suspect that it is much confounded with the var. *depilata* of *H. hispida*.

H. hispida var. *fusca*, Menke. — Ledstone and Newton, near Castleford.

Var. *albida*, Jeff.—Featherstone, (J. W.). Bristles numerous, long, and much hooked.

H. virgata var. *carinata*, Jeff. — A few intermixed with the type on a bank within the town of Pontefract, September, 1886.

H. caperata var. *major*, Jeff. — Two specimens attached to blades of grass on a pond-side at Milford. They were suspended on the grass within a few inches of the water. The usual small form of this species is generally found on dry banks. The *caperata* mentioned as being on the wet horse-trough was large. Is this supposed *major* a different species with a preference for moisture? Diameter of the Milford specimens, 13 mill.

H. pulchella. — Occurs numerously on a wall, amongst ivy, close to Wentbridge.

Clausilia rugosa var. *albida*. — Near Smeaton (J. W.). Varieties or aberrant forms seem to keep much together in one place when once fairly established. Near Pontefract there is a certain spot at which *C. rugosa* var. *albida*, *Helix virgata* var. *minor* (or at least a very small form), *H. nemoralis* var. *olivacea*, and *H. arbustorum* var. *cincta* may always be found—each in its own locality.

C. laminata var. *albida*. — One specimen in rotten wood in a lane near Fairburn. The shell was in the upright stump of a tree—I think beech, but there was no bark. Noticing one or two of the type much bleached creeping on the outside of the stump, I began to dig with a pocket-knife, and soon turned out from the interior several very glossy, brown, unbleached specimens, along with the white one. They might have gone in through holes made by woodlice or beetle larvæ, or they might have eaten their own way in. The circumstance reminded me of a similar fact recorded of *Helix lapicida* by Jenyns, as follows:—"Dec. 8th, 1822. We found a pollard elm this morning pierced in all directions by *Helix lapicida*. On tearing away the bark and portions of the wood, great numbers were observed of all sizes. The tree was so weakened by their attacks, and so much of its substance gone, that a slight wind would have been sufficient to overturn it. These animals appear to eat their way along in the same manner as woodlice, and will soon devour all the internal wood of a tree where they abound. Some of the individuals observed in this instance were in a torpid state, and had stopped up the mouths of their shells with a bung of sawdust and small

chips of wood cemented together.”—‘Observations in Natural History,’ p. 321.

Achatina acicula.—One or two specimens in a limestone bank at Went Hill, June, 1886.

Since the foregoing notes were written a few other observations have been made, as under :—

Bythinia tentaculata.—In addition to the type and the variety *ventricosa*, an elongate form of this species occurs near Fairburn, about five miles from Pontefract. The longest specimen taken there measures $14\frac{1}{2}$ mill. The length of the short ventricose form is 11 mill.

B. Leachii.—Collected in company with the elongate variety of *tentaculata*, September, 1886.

Limnæa peregra. — One of the specimens mentioned as from Methley is scantily hispid. Very few water shells are hispid. *Planorbis albus* is described as being hispid; in fact it was formerly called *P. hispida*, and the young of *Paludina vivipara* are downy.

Limax agrestis var. *nigra*. — One specimen at Newton, near Castleford, September, 1886.

Helix rufescens var. *minor*.—Featherstone, near Pontefract.

H. hispida var. *depilata*?—Featherstone and Newton.

THE LATE ARTHUR EDWARD KNOX, M.A., F.L.S.

THE accomplished author of ‘Ornithological Rambles in Sussex,’ ‘Game Birds and Wildfowl,’ and ‘Autumns on the Spey,’ after a long illness borne with great patience and resignation, has passed away in his seventy-ninth year. There must be very few of our readers who have not perused his volumes and liked them. The agreeable style in which they are written, combined with the variety of information about shooting, fishing, and Natural History, which the author had a happy knack of imparting, have made his books eminently readable, and at the same time as instructive in their way as the perhaps more familiar works of Charles St. John and John Colquhoun, next which they should find a place in every sportsman’s library.

Mr. Knox was one of those fortunate individuals who had no

professional cares to distract him or to hinder the free enjoyment of almost all field sports to which in their proper season he was so much addicted. Of Irish descent (being the son of Mr. John Knox, of Castlereagh), after graduating M.A. at Oxford, he spent much of his early life in the Co. Mayo fishing and Snipe-shooting; and although he took to soldiering nominally as a profession, and was for some time in the 2nd Life Guards, he retired upon being gazetted a captain; and, marrying Lady Jane Parsons, eldest daughter of Lord Rosse, settled down in the quiet enjoyment of country life in Sussex, first at Midhurst, next at Trotton, and eventually (on the death of his wife, who pre-deceased him) at Dale Park, near Arundel, where in the house of a married daughter he found all that loving attention and tender regard for his welfare which could cheer the heart of a father in his declining years.

Mr. Knox did not profess to be a scientific naturalist in the strict acceptation of the term, but he was an excellent outdoor observer of the ways of animals, and was especially fond of birds. Indeed, his collection of Sussex birds, amongst which were many valuable rarities, was a feature in his country house which never failed to attract and interest his visitors, especially if he were in the humour to act the part of showman, and could be prevailed upon to give the history of some of the more remarkable specimens. He could tell a story capitally, and, being a wonderful mimic, would give some of his Irish experiences with professional fowlers or fishermen in a manner that was most amusing. A tall, spare man, clean shaved, and with a clear keen eye, there was that about him which seemed to claim attention and respect from all with whom he might converse. He was what might be called a good "all-round sportsman"; for hunting, shooting, hawking, deer-stalking, fishing, and especially salmon-fishing, were his delight. As a privileged friend of his Grace of Gordon, he was a frequent visitor in autumn to Speyside, where he made successful frays amongst Salmon, Deer, and Grouse, and jotted down those pleasant field-notes which were subsequently printed in his 'Autumns on the Spey.'

An incident of his early life may here be mentioned as showing the courage and calmness of which he was capable in a case of emergency. In 1833, when fishing on a loch with his uncle, Major Knox, and a keeper named Hamilton, the boat was capsized

in a squall. The major, having lost an arm in the service of his country, would have perished but for the aid of his nephew, who swam ashore with him. He then returned for the keeper, but found that he had gone down. The poor man was afterwards found by the top of his rod which appeared above the surface, and when discovered was found to be standing on the bottom grasping his rod with both hands, as if to indicate his whereabouts while he held his breath as long as possible.

As a writer on Natural History topics, Mr. Knox, like many another naturalist who has risen to eminence, commenced to make his mark by forwarding communications to 'The Zoologist,' to which monthly journal (established in 1843) he contributed a series of articles on 'The Birds of Sussex.'* These paved the way for a 'Systematic Catalogue of Sussex Birds,' which soon after appeared in 1849 as an appendix to his 'Ornithological Rambles in Sussex,' a most entertaining work, which has passed through three editions. The favour with which this (his first book) was received encouraged him to undertake a second, and his 'Game Birds and Wildfowl, their Friends and Foes,' which appeared in 1850, proved no less entertaining and instructive, and has been rendered additionally attractive by Mr. Joseph Wolf's unrivalled illustrations. Many years elapsed before the third and last volume made its appearance, for it was not until 1872, or more than twenty years later, that he was induced to again take up his pen and give the world some more of his delightful experiences by flood and field. This book he dedicated to his Grace the Duke of Richmond, K.G., to whom he presented his collection of Sussex birds, which are now at Goodwood.

As a member of the old Hawking Club for some years, he was enthusiastic on the subject of falconry, and an admirably-written review of a work on this subject contributed by him to the 'Quarterly Review' for July, 1875, shows how well versed he was in the literature and practice of this much-neglected sport. Deer-stalking and hunting had to be abandoned some years ago; for, not only was age beginning to tell, denying the strength which such pursuits demand, but one or two bad falls in the hunting-field, and an accident which, by the upsetting of a dogcart, resulted in several broken ribs, caused him unwillingly to abandon

* See the volumes for 1843, 1844, 1845, 1849, and 1850.

the pursuit of Deer and Fox. A few hours now and then with gun or rod, requiring less severe exertion, was all that an enthusiastic sportsman, advancing towards threescore years and ten, could hope to have strength for and enjoy. Those who, like the writer, had the privilege to know him personally will mourn the loss of a most agreeable and accomplished friend and companion; while those who knew him only through his books must, we think, regret that the hand which wrote them can no longer impart to others any of that delightful enthusiasm which he constantly experienced in the pursuit of field-sports and the study of Natural History. He died on the 23rd of September last, and was laid to rest in the quiet little churchyard of Trotton, close to the house in which he had passed so many pleasant years of his life.

NOTES AND QUERIES.

MAMMALIA.

Variation of Colour in the European Squirrel. — My attention was attracted the other day by an unusual variety of the Common Red Squirrel, shot near Innsbrück about August 15th. Its peculiarity consisted in a circle or band of pure white hairs (nearly 7 cm. broad) across its tail. Although an old animal, both tail and ears were abundantly covered with fur. As regards the distribution of Black and Red Squirrels in the Vorarlberg and North Tyrol, I should reckon three black ones to every two red ones, the intermediate dark brown form being scarce; the two former often assume the grey pelage in winter, and interbreed freely. At Karlsruhe, in the extensive "Hardwald," the black variety is seldom seen; whereas the red and dark brown, now and then also tinged with grey, are comparatively abundant.—G. N. DOUGLASS (Stephanien Street, Karlsruhe).

Do Stoats and Weasels kill Moles?—In the spring of this year I found the freshly-killed bodies of two Moles (male), one of an orange and yellow contour, the other black. The light one has been severely handled, the stomach having been ripped open, and a large portion of the entrails having been eaten. The black Mole, which was lying about four feet away from the light one, had only one injury, which had apparently been inflicted by a Stoat, as it was situated at the side of the neck, and was of a circular form. This appears a strange instance of Nemesis overtaking the victor in the moment of triumph.—E. P. LARKEN (Gatton Tower, Reigate).

[Gilbert White, in his fortieth letter to Thomas Pennant, remarks, "Weasels prey on Moles, as appears by their being sometimes caught in mole-traps." But is this so? Is it not more likely that the Weasel is in pursuit of Field Mice, which use the Mole's runs?—ED.]

Hedgehog attacking Chickens.—About a fortnight since, between the hours of 7 and 8 p.m., the gardener here (Windermere), hearing a noise in the fowl-house, went to ascertain the cause. He found that a Hedgehog had seized a two months' old chicken. Before he could secure the depredator the candle which he was carrying went out; by the time he had procured a fresh light and returned with it to the fowl-house the animal had made off. The wounded chicken, which he took up, died in his hand; the Hedgehog had fixed its teeth in its side below the wing. That the Hedgehog has been credited with the character of a harmless animal, we all know; but I think the foregoing statement makes it clear that such is not the fact.—HENRY BENSON (Rector of Farncombe, Surrey).

BIRDS.

Little Gull in Co. Durham.—A specimen of the Little Gull, *Larus minutus*, was shot on Whitburn Sands, near Sunderland, on August 28th last, and was brought to me the same morning. It is in immature plumage, much like that of a young Kittiwake; eye and bill black; legs flesh-coloured; breast faintly tinged with roseate. The tail is distinctly forked, showing an affinity with the Terns, which latter birds were also numerous on this coast at the same date. They appeared on August 25th, on their passage southwards. Dimensions of Little Gull:—Length, $9\frac{1}{2}$ in.; expanse, 2 ft. 3 in.; weight a trifle over $3\frac{1}{2}$ oz. Sex, male. Sent to Mr. Cullingford, of Durham.—ABEL CHAPMAN (Silkstone Hall, Sunderland).

[The forked tail suggests that the bird is probably a young Sabine's Gull, the tail of the Little Gull being square at the extremity.—ED.]

Rooks nesting in Church Spires.—Referring to the note on this subject (p. 365), I may add that this year there has been a Rook's nest fitted into the crown-like ornament at the top of the steeple of Heworth Church, in York.—B. B. LE TALL (20, Bootham, York).

Storm Petrel at Skomer Island.—In Mr. Murray A. Mathew's paper on "A Visit to Skomer" (Zool. 1884, p. 433 *et seq.*), it is stated, "An old stone wall was pointed out to us as frequented by Stormy Petrels, . . . but we were not fortunate enough to find" a nest. When walking through Leadenhall, on Sept. 20th, I was pleased to find an adult and a nestling of this species just received from Skomer Island. The nestling was fully feathered, but still retained some of the sooty down, especially upon the belly. The date of its capture (Sept. 18th) is in harmony with what we already know of this late-breeding species. With the Petrels was sent a fine young Manx Shearwater, in plumage considerably resembling the adult,

as in the specimens from Eigg which I have described elsewhere. It would be gratifying to know whether our British form of the Shearwater ever assumes a dark breast in nestling plumage. The Eigg men hold that the young birds, which they constantly cook, always wear the white breasts of the adults.—H. A. MACPHERSON (3, Kensington Gardens Square, W.).

SCIENTIFIC SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.

October 6, 1886.—R. M'LACHLAN, Esq., F.R.S., President, in the chair.

Mr. W. Bartlett Calvert, of Santiago, Chili, was elected a Fellow.

Mr. M'Lachlan exhibited a number of seeds of a Mexican species of *Euphorbiaceæ*, popularly known as "jumping seeds," recently received by him from the Royal Horticultural Society. He stated that these seeds are known to be infested with the larvæ of a species of *Tortricidæ*, allied to the apple *Tortrix*; they were first noticed by Prof. Westwood at a meeting of the Society held on the 7th June, 1858, and the moths bred therefrom were described by him as *Carpocapsa saltitans* (cf. Proc. Ent. Soc., 2nd series, vol. v., p. 27). These seeds have since from time to time been referred to both in the United Kingdom and America. A discussion ensued in which Mr. Pascoe, Mr. Poulton, Mr. Roland Trimen and others took part.

Mr. Roland Trimen exhibited and read notes on some singular seed-like objects found in the nests of *Termites*, and also in those of true ants, in South Africa. They were apparently of the same nature as those from the West Indies, described in 1833 by the Rev. L. Guilding as *Margarodes formicarius*, which was usually referred to the *Coccidæ*, as allied to *Porphyrophora*. They were of various shades from yellowish pearly to golden and copper colour, and were strung together by the natives like beads, and used by them as necklaces and other personal ornaments, as, according to Mr. Guilding, was the case with the West Indian species.

Mr. W. F. Kirby exhibited, on behalf of Mr. John Thorpe, of Middleton, a long series of buff and melanic varieties of *Amphidasis betularia*, and read notes on them communicated by Mr. Thorpe. Mr. Kirby also exhibited, on behalf of Mr. Nunney, who was present as a visitor, a dark variety of *Argynnis aglaia* from Caithness, and a tawny-coloured variety of *Vanessa urticae* from Bournemouth.

Mons. Alfred Wailly exhibited a fine series of Saturnias and other Bombyces, mostly bred by him, from South Africa: also specimens of *Dirphia tarquinia*, *Attacus orizaba*, *Platysamia cecropia* and *P. ceanothi*, *Cullosamia angulifera*, *C. promethæa*, *Philosamia cynthia*, and other species from Central America. He also exhibited ova of *Saturnia tyrrhea*, pupæ of this and other South African species, and a cocoon of *Bombyx ochadama* from Madagascar. Mons. Wailly stated that several of the large South

African *Saturnidæ* formed no cocoons, the larvæ entering the earth to undergo the change to the pupal state. Mr. Trimen said he was able to confirm this statement.

The Rev. W. W. Fowler exhibited a number of minute *Acari*, which had been doing injury to fruit trees near Lincoln.

Mr. Poulton gave an account of the experiments recently made by him with the larvæ of several species of the genus *Vanessa*, for the purpose of ascertaining the relations of pupal colour to that of the surface on which the larval skin was thrown off, which had formed the subject of a paper read by him last month before the British Association. He also exhibited the frame constructed by him for the purpose of these experiments. The President and Messrs. Trimen, Waterhouse, White, Hall and others took part in the discussion which ensued.

Mr. Slater exhibited a specimen of *Prionus coriarius* found in Devonshire on fennel, and a specimen of *Calandra palmarum* found alive at Pembroke Dock.

Mr. Enock exhibited *Mymar pulchellus*, and a specimen of *Atypus piceus* recently taken on Hampstead Heath.

Mr. Elisha exhibited a series of *Gelechia hippophaëlla* (Sch.), bred from larvæ collected at Deal on *Hippophaë rhamnoides*.

Mr. Billups exhibited *Echthrus lancifer*, Gr., a species of *Ichneumonidæ* new to Britain, taken at Walmer on the 15th August last. He remarked that Brischke had bred members of this genus from *Sesia spheciformis*, *S. formicæformis*, and *Leucania obsoleta*; but that in this country the genus was little known, only one species (*Echthrus reluctator*) being mentioned in Marshall's list of British *Ichneumonidæ*.

Mr. E. A. Butler exhibited a male and female of *Macrocoleus tanacetii* from Bramley, near Guildford; living specimens of *Chilacis typha*, received from the Rev. E. N. Bloomfield, of Guestling, Hastings; and a pair of *Harpalus discoideus*, obtained in August last on a heath near Chilworth, Surrey.

Mr. A. J. Rose exhibited specimens of a mountain form of *Lycæna virgaurea*, recently collected by him in Norway.

Mr. Champion exhibited *Teratocoris antennatus* and *Drymus pilicornis*, taken near Sheerness.

Mr. W. White exhibited specimens of *Proctotrypes ater* (Nees); he also exhibited a specimen of *Chelonia caja* with abnormal antennæ, and read notes on the subject.

Mr. Elisha read a paper "On the life-history of *Geometra smaragdaria*."

Mr. C. O. Waterhouse communicated a paper "On the Tea-bugs of India and Java."

During the meeting a telegram was received from Mr. Freeman, of Plymouth, announcing the recent capture, in Cornwall, of *Anosia plexippus*.

—H. Goss, *Secretary*.

NOTICES OF NEW BOOKS.

Report on the Migration of Birds in the Spring and Autumn of 1885. By a Committee appointed by the British Association. 8vo, pp. 173. Edinburgh: M'Farlane & Erskine. 1886.

THE Seventh General Report of this Committee, consisting of Mr. Cordeaux (Secretary), Prof. Newton, Messrs. Harvie-Brown, Eagle Clarke, Barrington, and More, is comprised in a pamphlet of 173 pages, and includes observations taken at lighthouses and lightvessels, as well as at several land stations, on the coasts of Great Britain and Ireland and the outlying islands.

The fact that several keepers of lighthouses and lightvessels have forwarded legs and wings of such specimens as have been killed against the lanterns, and were unknown to them, has led to the determination of several rare birds which otherwise would have escaped notice. It is evident that unless the birds can be correctly named, the value of this inquiry is materially diminished, and it is intended, in order to facilitate the sending of wings, to supply the light-keepers with large linen envelopes, ready stamped and addressed.

The Committee acknowledge important assistance from Mr. H. Gätke in forwarding a daily record of the migration of birds as observed at Heligoland between January 1st and December 31st, with the concurrent meteorological conditions under which the various phenomena occurred.

Altogether 187 stations were supplied with printed schedules for registering the observations, and returns have been sent in from 125. The general results are satisfactory, and additional information of interest has been accumulated respecting the breeding habits of sea-fowl on the outlying islands and skerries on the Scotch and Irish coasts.

A special point of interest in this Report is the large arrival, with a north-east wind, of Pied Flycatchers in the first week in May, 1885, observed at Spurn Point, Flamborough Head, the Isle of May, and Pentland Skerries. At Flamborough Head the Flycatchers were accompanied by male Redstarts in large numbers, both species swarming for two or three days. The immigration at this period was not exclusively confined to these

two species. Mr. Agnew, writing from the Isle of May, at the entrance of the Firth of Forth, says, under date of May 3rd:—"An extraordinary rush of migrants to-day; have never seen anything like it in spring. To attempt to give numbers is simply useless. I will just give you the names in succession: Fieldfares, Redwings, Ring Ouzels, Blackbirds, Lapwings, Dotterels, Rock Pigeons, Hawk, Meadow Pipits, Redstarts, Whinchats, Tree Sparrows, Yellow Wagtails, Ortolan (obtained), Robins, Chiffchaffs, Wood Warblers, Blackcap Warbler, Marsh Tit, White-throats, and Pied Flycatchers." And on the 4th:—"Still increasing in numbers, but wind shifted this morning to E. for S.E."

A noteworthy incident also of the vernal migration was the great rush of Wheatears observed at the Bahama Bank vessel off the Isle of Man, and at Langness on the night of April 13th, when many perished and were captured. On the same night Wheatears were killed at the Coningbeg and Rathlin Island light-houses, on the Irish coast. On the 12th and 13th the rush was very heavy at stations on the west coast of Scotland. No corresponding movement was observed on the east coast of Great Britain on the same night; but at Hanois lighthouse, Guernsey, on the 10th of May, at night at the north light, and on the Lincolnshire coast and Farn Islands on the 10th and 11th. This shows the immense area covered by the migration of this species at or about the same period. On the east coast the first Wheatears were observed at the Farn Islands on February 22nd.

The autumnal migration was first indicated at Heligoland on July 6th, and was continued with slight intermissions up to the end of the year. A similar movement affected the whole of the east coast of Great Britain during the same period, but was apparently less constant and persistent than at Heligoland.

It has been remarked in previous years that the migration of a species extends over many weeks, and in some cases months. Yet it is observable that, at least on the east coast of England, year by year, the bulk or main body of these birds come in two enormous and almost continuous rushes during the second and third weeks in October and the corresponding weeks in November.

In the autumn of 1885 it was observable that the chief general movements which usually characterise the southward

autumnal passage were two in number, and affected the stations over the whole coast line both east and west of Great Britain. The first of these commenced about the 11th of October, and was continued to the 20th. The second from the 8th to the 12th of November. It is worthy of notice that these two chief movements of the autumn were ushered in by and were concurrent with anti-cyclonic conditions, preceded by and ceasing with cyclonic depressions, affecting, more or less, the whole of the British Isles. From this it appears not unlikely that birds await the approach of favourable meteorological conditions—of which perhaps their more acute senses give them timely warning—to migrate in mass. Whatever may be the cause which impels these enormous rushes, often continuous for days, it is one which operates simultaneously over an immense area.

The October rush reached its maximum on the 16th, at which date almost all the stations report extraordinary numbers of various species on the wing. As one out of many, we quote from the journals of Mr. James Jack, principal of the Bell Rock lighthouse:—"Birds began to arrive at 7.30 p.m., striking lightly and flying off again; numbers went on increasing till midnight, when it seemed that a vast flock had arrived, as they now swarmed in the rays of light, and, striking hard, fell dead on the balcony or rebounded into the sea. At 3 a.m. another flock seemed to have arrived, as the numbers now increased in density; at the same time all kinds crowded on to the lantern windows, trying to force their way to the light. The noise they made, shrieking and battering the windows, baffles description. The birds were now apparently in thousands; nothing ever seen here like it by us keepers. Wherever there was a light visible in the building they tried to force their way to it. The bed-room windows being open for air all night, they got in and put the lights out. All birds went off at 6 a.m., going W.S.W. Red-wings were most in number; Starlings next; Blackbirds, Fieldfares, and Larks." The rush in November chiefly took place in the night; at the Bell Rock the movement ceased at midnight of the 12th and at the Longstone lighthouse, on the Farn Islands, a little earlier—at 10.30 p.m., when the wind became strong from S.W.

From each succeeding year's statistics the Committee have come to almost similar conclusions regarding the lines of flight—

regular and periodically used routes where the migratory hosts are focussed into solid streams. Three salient lines on the east coast of Scotland are invariably shown, *viz.*:—(1) by the entrance of the Firth of Forth, and as far north as Bell Rock, both coming in autumn and leaving in spring; (2) by the Pentland Firth and Pentland Skerries, likewise in spring and autumn; and (3) by the insular groups of Orkney and Shetland, which perhaps may be looked upon as part of No. 2. On the other hand, from three great areas of coast line, including many favourably lighted stations, returns are but rarely received. These areas are Berwickshire, the whole of the east coast south of the Moray Firth, and Caithness and East Sutherland. All of these possess high and precipitous coast lines, if we except the minor estuaries of the rivers Tay and Dee, and a small portion of the lower coast line of Sutherland, which face towards the east.

On the east coast of England these highways are less clearly demonstrated. The Farn Islands, Flamborough Head, and the Spurn are well-established points of arrival and departure; but south of the Humber as far as the South Foreland the stream appears continuous along the whole coast line, and to no single locality can any certain and definite route be assigned. It cannot be said that the southerly flow of autumn migrants is equally distributed along the entire west coast of England. On the contrary, the schedules afford unmistakable evidence that the great majority of these migrants, so far as the English and Welsh coasts are concerned, are observed at stations south of Anglesey. But while the north-west section of the coast is thus less favoured than the rest, such is not the case with the Isle of Man, which comes in for an important share of the west coast migratory movement. Large numbers of immigrants from Southern Europe pass through the Pentland Firth, and (along with migrants from Faroë, Iceland, and Greenland) down the west coast of Scotland, whence many cross to Ireland, and it seems probable that the remainder leave Scotland at some point on the Wigtown coast, and pass by way of the Isle of Man to the west coast of Wales, and thus avoid the English shore of the Irish Sea. The schedules sent in from the coasts of Flint, Cheshire, Lancashire, and Cumberland show that in 1884-85 comparatively few migrants were observed, and that the great general movement did not affect them in any general degree.

These remarks do not apply to migrants among the waders and ducks and geese, which, as a rule, closely follow coast lines, and which are abundantly represented on the Solway and coasts of Cumberland and Lancashire. There is a much used bird route along the north coast of the Bristol Channel, and thence from the Pembroke coast, across to Wexford, passing the Tuskar Rock, the best Irish station.

The fact of a double migration or passage of birds, identical in species, across the North Sea in the spring and autumn both towards the E. and S.E. to the W. and N.W., is again very clearly shown in the present report. This phenomenon of a cross migration to and from the Continent, proceeding at one and the same time, is regularly recorded on the whole of the east coast of England, but is specially observable at those light-vessels which are stationed in the south-east district; at the same time, it is invariably persistent and regular year by year.

The most interesting stations are those on small islands or rocks, or light-vessels at a considerable distance from shore, and the regular occurrence of so many land birds, apparently of weak power of flight, around these lanterns is a matter of surprise to those unacquainted with the facts of migration. No clear indication of the migration of the Redbreast has yet been shown on the Irish coast; the records of its occurrence are few and scattered. The Black Redstart was recorded at several stations in the southern half of Ireland; specimens were forwarded from Mine Head, the Skelligs, and Rockabill. It is apparently a regular winter visitant to the Skelligs and Tearaght, generally appearing in October and November. The dates so far recorded by the Committee of the occurrence of the Black Redstart on the east coast of Great Britain, in the autumn, range between October 23rd and November 3rd.

Ornithologists ought to feel much indebted to the members of this Committee for the great personal trouble and correspondence undertaken by them in this attempt to elucidate the interesting problems affecting the Migration of Birds, and the Committee, we think, should be heartily congratulated on the success which has so far attended their efforts.



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[No. 120.]

NOTES ON THE ORNITHOLOGY OF NORTHAMPTONSHIRE AND NEIGHBOURHOOD.

BY THE RIGHT HON. LORD LILFORD.

I RESUME my notes from my last date on this subject, June 3rd, 1885 (Zool. 1885, p. 259).

June 30th.—Heard from my head gamekeeper that one of his men had discovered some young Pied Woodpeckers, *Picus major*, in a dead branch of a fir-tree in a large wood near this house. I note this, as, although this Woodpecker is not very rare in our neighbourhood, we seldom meet with its nest.

August 4th.—We this day found two nests of Reed Warblers, *Acrocephalus arundinaceus*, on the banks of our river, containing respectively three and four eggs. The first nest was not, as usual, placed amongst stems of growing reed, or, as we occasionally meet with it, in upright growing branches of willow, but was suspended between three of the thick pith-rushes, locally known as “bolders,” and much used for basket-making. This is the first instance of the birds choosing these plants as a nesting-place that has ever come to our knowledge, and strikes us as all the more remarkable from the fact of the abundance of reeds within a few yards of this singularly situated nest.

Aug. 12th.—First Snipe, *Scolopax gallinago*, of the season seen in this neighbourhood.

Aug. 13th.—We noticed an adult Hobby, *Falco subbuteo*, close to this house.

Aug. 15th. — A young Cuckoo, *Cuculus canorus*, observed "hawking" over the river in pursuit of insects, after the manner of the Nightjar.

Aug. 22nd. — A Barn Owl, *Strix flammea*, noticed by us flying to and fro over a meadow near this house, in broad daylight and sunshine, about 3 and 4 p.m.

Aug. 24th. — Our usual harvest-time invasion of Sparrowhawks, *Accipiter nisus*, seems to have set in; one of the gamekeepers brought in two young females shot this morning, and reports of a sudden appearance of this species in some numbers reach us from all parts of the neighbourhood. A singularly fine adult male was killed by another of our gamekeepers on 28th inst.

Aug. 25th. — We observed what may fairly be termed a flock of Song Thrushes, *Turdus musicus*, certainly not less than sixty or seventy, collected in a small willow-bed close to this house.

Aug. 28th. — My friend Lieut.-Col. L. H. Irby told me that a Snipe committed suicide on Wadenhoe mill-stream by decapitating itself against some linked scythe-blades with which the waterweeds were being cut.

Aug. 26th to 30th. — Sand Martins, *Cotyle riparia*, by no means a very abundant species in this immediate neighbourhood, appeared in great numbers about our river close to this house, between the dates given above.

September 2nd. — We saw the first Grey Wagtail, *Motacilla melanope*, of the season at Lilford Locks.

Sept. 4th. — The first Peregrine, *Falco peregrinus* (female) of the season, seen by one of our gamekeepers to cut down a Partridge on Pilton; the same keeper reports having repeatedly noticed a Hobby lately in the Aldwinkle district.

Sept. 29th. — Starlings, *Sturnus vulgaris*, in small flocks very busy at the elder-berries, which are remarkably abundant this autumn in our neighbourhood.

October 1st. — The first Ring Ouzel, *Turdus torquatus*, of the season seen near Lilford Reservoir.

Oct. 2nd. — We noticed the first evidently migrating flock of stranger Wood Pigeons, *Columba palumbus*.

Oct. 9th. — Heard for the first time this season the well-known chatter of the Fieldfare, *Turdus pilaris*; this is an unusually early occurrence of this species in this district.

Oct. 12th.—The first Teal, *Anas crecca*, of the season, shot by my son near Aldwinkle. I cannot look upon this as the earliest seasonal occurrence of the Teal with us this year, as we generally meet with a few in September, and not rarely in August, but their favourite haunts had not been lately invaded by any of us, and the above is the first appearance that has come to my knowledge this autumn.

Oct. 15th.—The first Grey Crow, *Corvus cornix*, of the season positively identified, but I feel very little doubt about having heard one of these birds some three days ago. A Twite, *Linota flavirostris*, taken alive by a birdcatcher near Thorpe Achurch.

Oct. 20th.—The first Woodcock, *Scolopax rusticola*, of the season reported to us as seen within a very short distance of this house.

Oct. 21st.—A Mealy Redpoll, *Linota linaria*, taken alive by birdcatcher near this place; I consider this species as an exceedingly rare visitor to this district. We heard to-day, from the Hon. Thomas Fitzwilliam, a most circumstantial account of his having seen at very close quarters, near Milton, two birds, which from his description must have been Little Owls, *Carine noctua*; Mr. Fitzwilliam was uncertain as to the date of this occurrence, but thought it was about ten years ago.

November 3rd.—A pair of Pintails, *Anas acuta*, reported to us as frequenting our home and decoy ponds.

Nov. 14th.—About two days before this date a Red-throated Diver, *Colymbus septentrionalis*, was picked up alive near Pytchley, and brought to Mr. J. Field, of Kettering, who informed me by letter of the occurrence, but called the bird a Great Northern Diver; the specimen was, however, examined shortly afterwards by the Rev. H. Slater, who kindly told me that it was a fine example of *C. septentrionalis* in winter dress.

Nov. 20th.—About this day a bird, which was reported to me as an "Eagle," was seen by one of our gamekeepers near this house; from subsequent accounts given by others who saw this *rara avis* we have no doubt that it was a Rough-legged Buzzard, *Buteo lagopus*. This individual haunted our neighbourhood for some weeks after the above date.

Nov. 28th.—I received a letter from the Rev. H. Slater, informing me that he had seen, at a birdstuffer's shop in Wellingborough, an adult specimen of the Arctic Tern, *Sterna macrura*,

and was assured that the bird in question was killed early in August last, near Sharnbrook Beds. In the same letter Mr. Slater told me that a Wood Sandpiper, *Totanus glareola*, was shot on Irchester Brook shortly before Nov. 20th.

December 2nd.—Under this date Mr. Slater wrote to me that he had recently visited the shop of Mr. J. Field, of Kettering, and seen, amongst other birds, the following species, which are of some local interest; no dates and few precise localities were given, but Mr. Slater was informed that all the birds had been obtained in the neighbourhood of Kettering:—Seven Snow Buntings, *Plectrophanes nivalis*, “in dusky dress of late autumn.” Quail, *Coturnix vulgaris*, picked up between Kettering and Rothwell. Hoopoe, *Upupa epops*, “obtained near Brigstock”; this is without doubt the specimen recorded by me in ‘The Zoologist,’ 1885, p. 259. Bar-tailed Godwit, *Limosa lapponica*, “in full winter dress”; this is the only record that has reached me of the occurrence of this species in our county.

Dec. 18th.—White-fronted Goose, *Anser albifrons*; a solitary individual of this species clearly identified by Lieut.-Col. Irby on one of our meadows near Achurch.

January 30th, 1886.—Water Ouzel, *Cinclus aquaticus*, “shot in Broughton field, near Kettering,” reported to me by Mr. J. G. Field, of Kettering, of whom I subsequently purchased the specimen—a very fine one—and presented it to the Northampton Museum.

April 26th.—I received, through Lieut.-Col. Irby, three adult specimens of Black Tern, *Hydrochelidon fissipes*, shot near Lilford by one of our gamekeepers from a flock of about thirty on 24th inst.

July 13th.—On the evening of this day an adult Night Heron, *Nycticorax griseus*, was clearly seen and identified by my friend last named on the banks of our river not far from Aldwinkle. This bird was frequently seen and reported to me by several persons worthy of credence at intervals from the above date till Sept. 6th; on this last occasion my informant, who had often seen the bird, declares that it had a companion of the same species.

July 28th.—On this day a party of three friends, accompanied by my falconer, went on an insect-collecting expedition to a large wood at no great distance from this house; knowing

that the Hobby, *Falco subbuteo*, frequently bred in the locality, I particularly begged them to try to find a nest. They had hardly entered the wood when they heard the cry of the old Hobbies, and one of the party, after some search, descried an old nest of Carrion Crow, to which the falconer climbed, and therein found three young Hobbies, which he considered as rather too young for taking at the moment; but, as the wood in question is virtually unpreserved, and much frequented by entomologists and loafers of all sorts, I sent him up again on the 31st, and he brought the young birds home to me. They seemed to be strong and healthy, and we put them out "to hack" in the park, but on taking them up they began to droop one after another, so I turned them adrift again. They remained about the park for a short time, but all took their departure before the middle of September.

Landrails, *Crex pratensis*, seem to be unusually abundant with us this year, and reports reached me of their being heard "craking" every night till nearly the middle of August. It is probable that this unwonted continuance of what is undoubtedly the pairing or love-call of this species may have been caused by the destruction of many eggs in the heavy floods of May last; a nest of eggs hard-set was brought to me on August 9th, and a young bird not very long hatched, caught in one of our meadows shortly afterwards. In connection with these late broods, I may mention that my son and two friends met with seven Landrails on October 12th in a piece of strong seed-clover. We seldom hitherto have met with more than an odd one or two in this neighbourhood after the end of September, though in most seasons our meadows are alive with them during the summer months.

The first Snipe, *Scolopax gallinago*, shot here this season fell on August 3rd. The decoy-man afterwards told me that he had seen two or three of these birds about the decoy-pool before this date. I look upon this species as an autumnal migrant to this immediate neighbourhood, though it occasionally has bred to my knowledge in the Nene Valley to the north of our property.

Colonel Irby, often before quoted, informed me that he saw an adult Common Tern, *Sterna fluvialis*, near Wadenhoe on August 10th.

The first Peregrine, *Falco peregrinus*, of the season was

reported to me about the last date, and has been frequently seen since.

A pair of Teal, *Anas crecca*, were seen by my son on the decoy-pool on Sept. 5th; the decoy-man told him that they had been there for some days, and about this time assured me that he had seen and heard several Whimbrels, *Numenius phaeopus*, and a few Redshanks, *Totanus calidris*, over and about the meadows near the decoy.

Sept. 8th.—A Quail, *Coturnix communis*, was seen by Colonel Irby on the Wadenhoe Manor; this species, which was by no means very uncommon and occasionally bred near Lilford till within the last fifteen years, has of late become very scarce hereabouts, though I have reason to believe that it is found pretty frequently in the neighbourhood of Northampton.

The first Jack Snipe, *Scolopax gallinula*, of which I heard this autumn was reported to me by G. Edmonds, Esq., of Oundle, as shot by him in a meadow near that town on September 28th; he also informed me that he flushed a Woodcock, *S. rusticola*, on the same day; if he is not mistaken in this latter case, the bird was in all probability bred in the county.

Grey Wagtail, *Motacilla melanope*, first of the season, seen at Lilford Locks, Sept. 20th, but not reported to me till Oct. 3rd.

October 4th.—I heard a Tawny Owl, *Strix aluco*, hooting loudly shortly before 1 p.m., with a cloudless sky and bright sunshine. We have a great many of these and the Barn Owl in the park and pleasure close to the house, where, as in all places over which I can exercise any control, I have always done my best to prevent the destruction or molestation of these beautiful and most useful birds. In this connection I may mention that my falconer assured me that in a cavity of an old elm tree in the park, from which three young Tawny Owls had taken their first sally in April last, he found in the following month a Wild Duck's nest containing thirteen eggs, from which thirteen young Ducks were very soon afterwards hatched, and safely taken away by the parent bird or birds.

In reply to my enquiries, I received a letter from H. S. O'Brien, Esq., of Blatherwyche Park, Wansford, under date October 5th, 1886, in the following words:—"There have been two pairs of Great Crested Grebes on the water here all through the spring and summer of this year; two of them are still here.

I cannot, I am sorry to say, state positively that they have bred here, but my children have repeatedly told me that they have seen the old Grebe and two young ones." I may add that the piece of water above referred to is of several acres in extent, and, although bordered on one side by a high road, is much frequented by various wildfowl. The Great Crested Grebe occasionally visits our river in this neighbourhood during severe weather, but the above is the first intimation that I have received on good authority of its breeding in the northern division of our county, though I believe that of late years it has been found breeding on some of the large reservoirs in the southern division, as also in Rutland.

I may perhaps be allowed to explain the poverty and paucity of my notes on migratory birds by the facts that we were absent from home from the latter end of October, 1885, till July 1st, 1886, and that since the latter date my personal ornithological observations have been confined by my infirmities to such as are possible from a wheeled chair in the immediate neighbourhood of this house. I have heard of the death of a Redwing, *Turdus iliacus*, on Sept. 21st, and the appearance of this species "a few days previously;" also that the Grey Crow was heard about the beginning of October, and seen since that date; but in neither of these instances have I been able to arrive at positive certainty as to earliest occurrence.

ORNITHOLOGICAL NOTES FROM NORFOLK AND SUFFOLK FOR 1885.

By T. E. GUNN, F.L.S.

THE following notes, from October, 1884, to December, 1885, include the most noticeable ornithological occurrences, principally the results of personal observation.

As usual I have to notice one or more captures of the Peregrine Falcon. On the 2nd of January an adult pair were shot at Morton, near Norwich; the female, although severely wounded, managed to make her escape. Another adult female was sent in during the previous month, having been killed near

Wells on the 16th. This enabled me to particularly notice the relative proportions in the sexes when placed side by side.

	Male.	Female.
Weight	26 ozs.	40 ozs. avoird.
Total length (bill and tail included)	17 inches	20 inches
Full expanse of wings . . .	38 $\frac{3}{4}$ „	46 „
Wing from carpal joint . . .	12 $\frac{1}{2}$ „	14 $\frac{3}{4}$ „
Bill along ridge of upper mandible	1 $\frac{1}{4}$ „	1 $\frac{1}{8}$ „
Tail from tip to root . . .	6 $\frac{1}{2}$ „	8 „
Tibia	3 $\frac{1}{2}$ „	4 „
Tarsus	2 $\frac{1}{8}$ „	2 $\frac{1}{4}$ „

The plumage of each was as nearly alike as possible. In the dissection of both I detected the presence of parasites, a circumstance I have invariably noticed in this species.

On December 17th last a local birdcatcher brought me a mature male Merlin, in good plumage, which he had caught in his nets at Cossey, near this city, during the afternoon, it having dashed in after his call-bird. This bird weighed five and a quarter ounces avoirdupois. Prof. Newton, in his edition of 'Yarrell's British Birds,' gives the weight of the adult male as six ounces; Montagu says five ounces; the latter authority, in my opinion, being more correct.

On May 25th I found a nestling of the Long-Eared Owl sitting on the end of a fallen spruce. It had apparently just left the nest. Two days after I made a careful search in the same spot, and found a second young one sitting very quiet and close on a top branch of a tall fir, but could see no signs of the nest or old birds. I found a dead chaffinch without head or tail at the foot of a tree close at hand, freshly killed, and dropped by one of the old birds. The young had their stomachs quite full. In one I found the remains of a Thrush, and in the other the remains of a Bank Vole, and as many as three adult Chaffinches. On the 28th, the following day, I made another long and careful search for the nest and rest of the young without success; they had all evidently left the nest and shifted to another part of the wood. I have repeatedly noticed how quiet young Hawks and Owls are when being supplied with food by the parents.

The Little Owl, *Noctua passerina*, from its singular habits and grotesque actions, has for some years been a favourite with

me. If taken from the nest when young it is easily reared, soon becoming very tame. I have kept some four and five years. In a state of nature their food consists principally of young birds, small mammals, and insects. In confinement, whenever any of the above are not easily procurable, I find that raw lean beef is a good substitute, of which it soon gets very fond, even preferring it to other food. I have occasionally varied its diet with beetles, moths, grasshoppers, butterflies, caterpillars, lizards, water-newts, and living as well as dead fish, such as minnows and small roach. Feathers and fur, as well as bones and other refuse, are (as usual with the Raptores) thrown up in pellets of an oblong shape. Mr. J. H. Gurney had a pair of these birds in confinement, in 1851, that nested, and laid four eggs about the middle of May. Two of these they soon broke, but hatched the other two early in June. These nestlings did not long survive, Mr. Gurney being unable to say how they disappeared; he is inclined to think the old birds devoured them. Although I have been the possessor of quite a number of Little Owls at different times, and rather successful in obtaining prizes for them as cage birds at bird shows, I was never fortunate enough to get them to nest until last spring, when a pair hatched and successfully reared their young in my aviary. The following are the notes I made concerning them:—Early in the autumn of 1884 I bought three pairs of these Owls in immature plumage, and placed them in a cage I had formed in a recess in my back garden. I had just previously received a nest of three young of *Strix otus*, one of which I sent away for want of room. One of the two remaining ones came to an untimely end by breaking a leg and wing in a fight. The odd bird soon fraternised with the new comers, which continued for some time, when the Long-Eared Owl and one of the most pugnacious of its companions had a pitched battle which resulted in the death of the latter. Soon after two of the little owls had a sharp set to, and another victim was added to the death-roll. On dissecting the latter I found its breast pierced all over; the sharp claws of its antagonist in some instances penetrating the breast-bone. I have never kept birds that show such pugnacity. Two combatants will oftentimes fasten their claws into each other with such ferociousness that even a fall from the branch to the floor of the cage will not cause them to loose their hold. In the month of March a pugna-

cious survivor commenced a series of combats, and so I put her in a separate cage. I had now remaining three Little Owls and the Long-Eared Owl. Two of the former now gave signs of being on affectionate terms with each other; and all through the following month (April) this pair of birds kept well together, or calling and answering each other throughout the day and night, frequently during the day mating on the floor of the cage. On May 19th, about 9 p.m., the female deposited her first egg on the floor. This I took out for fear of being broken. On May 20th I removed the third Little Owl from the cage, and, having made a nesting-place by covering a box about a foot square with some pieces of cork bark, leaving an entrance in the front near the top, I placed a few small sticks and some hay inside, and hung it at one of the top corners of the cage. On May 21st the pair immediately took possession, and the female, having selected one corner, and made a depression in the nesting material, deposited the second egg during the evening, both birds removing some of the sticks from the box. On May 22nd the male bird determined to have the cage to himself and partner, so engaged in a series of combats with the Long-Eared Owl, driving him about until he was compelled to take refuge by squeezing himself between the top of the nesting-box and roof of the cage. He seemed so intimidated by the fierce onsets of its smaller foe that he did not dare to leave even to get his food, so I relieved him of his anxiety, and let the pair have the cage entirely to themselves. I placed the first egg by the side of the other in the nest. The female seemed very busy in her nest for a short time, occasionally leaving and returning. Sometimes the pair were at home; the male generally kept guard, however, on a branch just outside, and would dart at any intruder with fury. On May 23rd, during the latter part of the day, the female kept closer to her nest, and in the evening deposited her third egg. On May 24th, as I entered the cage, the male bird flew into the box and barred the entrance by showing fight, and on removing him I found the female sitting hard on her three eggs, and unwilling to move when I touched her. On May 25th the female was sitting close, and left the nest a few minutes only in the evening. On the morning of May 26th I looked into the nest, expecting to find the fourth egg, but was disappointed; the female still sat close. She came off the eggs for a short time in

the evening, the cock bird being as pugnacious as ever. The fourth egg was laid about 9 p.m. On May 27th the hen was sitting close, the cock carrying her food, which he placed in the box by her side. On May 28th she was still busy in keeping her eggs warm, leaving for a few minutes in the evening to stretch her wings and legs, the male supplying food as usual. May 29th to 31st no change in the position of affairs. And from June 1st to 17th the male kept his watch as usual, the female only leaving for a few minutes in the evening either to procure food or to expand her pinions, until June 17th, when, about 9 p.m. an usual commotion was caused by the female bird on the nest. She emitted a low, chuckling noise for upwards of half an hour. The male, meanwhile, was flying to and from his perch to the nest in an agitated manner. On the following morning, June 18th, I found the first young bird had been hatched during the preceding evening, hence the agitation of the parents. I lifted the box from the nail very carefully, and, having removed the cock (he having flown in as usual at my entrance to the cage), the female allowed me to lift her from the nest to the other corner of the box, when I picked up the newly-hatched young bird, which had been squeaking at intervals all the morning. It was about the size of an ordinary walnut, and pure white in colour, resembling a ball of cotton-wool. I looked round for the empty shell, but found that it had been pounded by the old bird into minute fragments (this will probably account for the disappearance of the egg-shells of raptorial birds, which I have sometimes been puzzled to account for after the young are hatched). The male bird became more particular in the choice of food he carried to the nest; one sparrow he plucked entirely before conveyance, and another he neatly disjointed. During this evening, at the same hour as before, 9 p.m., the female made the same chuckling noise, and I therefore concluded a second young one was hatching. On the following morning, June 19th, I examined the nest and found she had the young well covered by one wing, the two remaining eggs being close under her. I noticed a few fragments of egg-shells on the bottom of the cage. Later in the afternoon the female made the same kind of noise, which was continued at intervals throughout the evening. I therefore looked into the nest at 9 a.m. the following day, June 20th, and found the third young one with

half the egg-shell still attached to it. On the morning of June 21st I saw the third young one quite hatched. All three nestlings had their eyes closed. The first one, hatched on the 17th, and now four days old, was, I found, much improved, showing a remarkable difference in size on comparison with the others. On June 23rd, the three young, being well nourished, were rapidly increasing in proportions; the fourth egg (probably the first one laid) I found was addled, so I removed it, blowing it for my cabinet. Seven or eight sparrows, or food in proportion to this bulk, was now daily consumed by the family. The young were still unable to open their eyes, lying in their nest, and asleep like little pigs, very fat and plump. Having to leave home for a time on business, my diary of daily events became interrupted, and therefore does not contain any details relating to the growth and development of the first plumage in July; and the assumption of the second plumage in October, which took place at the same time as that of the parent birds, and which are scarcely distinguishable from each other. Not having to work for their daily sustenance they became very fat, the parent birds weighing $8\frac{1}{4}$ oz. and 10 oz. respectively, the three young being $7\frac{3}{4}$, 8, and 8 oz. Six ounces is said to be the weight of this bird in a state of nature. The above is the weight of the living birds as scaled by myself on the 31st of December. A female adult bird (one of my odd ones), having died on Nov. 24th, weighed 10 ozs. This, I believe, is the first occasion on which this Little Owl has bred and successfully reared its young to maturity in confinement in England. I hope to record some further proceedings on the part of my pets in my next notes.

In the stomach of an adult female Short-Eared Owl, killed 27th October, 1884, I found the feathers, bones, and other remains of a young Thrush, including the gizzard, which, having been swallowed whole, was unaffected by the gastric juice. On October 29th I received four Long-Eared Owls, three males and a female; the former weighed respectively 8 oz. 8 dr., 8 oz. 10 dr., and 9 oz.; the female, 10 oz. Two of their stomachs were crammed with the bones and fur of Field Voles; in that of another were portions of the skulls of seven Voles, and a mass of refuse sufficient to form nearly a dozen pellets of the size usually cast up.

An immature female Black Redstart, killed at Blakeney 22nd

October, 1884, weighed 4 dr. The food had consisted of small beetles.

On September 17th, 1884, a male specimen of the Great Snipe was shot near Stalham, and, although exceedingly fat, weighed but $6\frac{1}{2}$ ozs. The gullet contained half a lobworm, and in the stomach I found four or five small white worms.

A Grey Phalarope was killed at Burgh St. Peter, in Great Yarmouth, on October 30th. Its stomach contained some small pebbles, two univalve shells, remains of a fly, and some vegetable refuse, including two pips not unlike those of the ordinary raisin, but much smaller.

At 6 a.m. on October 9th I took a walk on the Yarmouth Denes from Caistor to the Harbour's mouth. Large flocks of Twites were continually passing during the whole morning, sometimes alighting to feed on the seeds of various grasses and plants growing on the sandy soil; large numbers of Sky Larks, Meadow Pipits, and Starlings, were also constantly moving southwards. The local birdcatchers were apparently out in full force, and netted a great number of birds, principally Meadow Pipits, Lesser Redpolls, and Twites. The birdcatchers call the Twite the "French Linnet," to distinguish it, I presume, from our familiar Brown Linnet. I saw a solitary Golden Plover, a few Wheatears, and Grey Crows; these latter birds had probably just arrived. A female Ring Ouzel was killed the day before; also a brace of Woodcocks, being the first birds of the season in this neighbourhood.

Two Shore Larks and a Snow Bunting were shot on October 6th, and a few other Buntings seen, but this date is somewhat early for these two species to be over in any number. Two swallows passed southward, flying very low, and a single bird passed later on in the same direction. I also saw a solitary Short-Eared Owl.

An immature female Honey Buzzard was shot on September 17th, 1884, in Gunton Park, and sent to me the following day. During the last few years this bird has become almost a regular autumn visitor to the Eastern Counties, and (as in this instance) generally in its first year's plumage. Occasionally (as in 1882) one is killed in the plumage of second year. The last obtained measured 23 inches in length and 4 feet 4 inches across its fully expanded wings. Weight 1 lb. 14 oz. The bird proved

very plump in condition, and (as testified by the contents of its stomach and crop) had recently visited a bees' nest.

A male example of *Picus major* was shot near Norwich on October 23rd, 1884. The red of the vent extended over the abdomen, and was of a more brilliant tint than usual; there were also a few scarlet feathers on its chest, and several other feathers were tinged with the same hue; this is rather unusual, and, I am inclined to think, indicates age. In its stomach I found a spider and a large quantity of the white kernels of hazel nuts and a few pebbles. The presence of vegetable food of any kind in the stomach of a Woodpecker is (according to my experience) very unusual. Twenty years ago a somewhat similar instance came under my notice (Zool., 1865, p. 9468), the stomach of a Green Woodpecker which I examined in October being filled with oats and the fragments of two or three acorns. Naumaun states that acorns form an occasional article of diet with *Picus viridis*, and Bechstein asserts that this bird will crack nuts.

A cock Linnet (*Linota cannabina*) was brought to me on 8th May last which had just died, after living as a caged bird just seventeen years in the possession of a Mr. Lincoln of this city. I have kept Goldfinches from eight to ten years, and have known canaries to live even twenty years.

At page 480 of 'The Zoologist' for 1885 I recorded the capture of a female Roller near Norwich, and, having twenty years previously received a male bird, I have compared the two, with the following result:—The principal measurements were—In total length (beak and tail inclusive), male $12\frac{1}{2}$ in., female $13\frac{1}{4}$ in.; expanse of wing, male 25 in., female $25\frac{1}{2}$ in.; wing (from carpus), male $7\frac{5}{8}$ in., female $7\frac{3}{4}$ in.; bill to gape, male $1\frac{3}{4}$ in., female $1\frac{3}{4}$ in.; tail, male 5 in., female 5 in. The female, being slightly the larger of the two, weighed $4\frac{3}{4}$ ounces.

A Blackbird was shot at Fleggburgh, near Yarmouth, Dec. 8th, 1884, which had the head, neck, and under parts of a rufous brown; crown of head, back, wings, and tail of a brownish ash; bill and legs brown; irides pale brown. Another, in similar plumage, was killed at Narford, near Swafham, on 9th January, 1885; it had the tips of the primaries dirty white; bill deep yellow; irides paler brown than usual.

A white Sparrow was shot on the 16th October, 1885, at Banham, near Attleborough, and proved on dissection to be a male. It was not a true albino, however, the eyes being of a pale brown. The bill, legs, and toes pale brown. Two varieties of the Greenfinch were brought me by a local birdcatcher, who had netted them with others near Norwich in December, 1884, and January, 1885. They were exactly alike, and may have been from the same nest, as they were caught in localities not three miles apart. The plumage was of a pale uniform cinnamon colour, with pale green rump. Bill, eyes, and legs pale brown.

A pure white Skylark was caught on December 5th, 1885, in this neighbourhood, and was kept alive in an aviary with other birds. I have previously known, and have had in my possession, both white and albino varieties; also sandy coloured and piebald examples; and on one occasion a peculiar melanoid variety, which was also caught by a birdcatcher, neither the plumage nor feet showing any trace of previous confinement.

An old cock Blackbird with a white face was killed at Witchingham on the 28th of October.

Mr. Harward, jun., informed me (October 19th, 1885) that a Robin with a white crown had frequented his garden at Bracondale all the summer, and had mated with a bird of ordinary plumage. A nest was built in some ivy, and a brood of young were hatched which did not vary at all from the normal plumage.

A young hen Partridge was shot at Wells, on October 1st, having the entire plumage sprinkled with white feathers.

In the case of the Rook I have seen buff, cream-coloured, albino, and pied varieties, the last named by far the most common. The most singular variety I have seen (shot at Leiston, in Suffolk, in January, 1885) had the whole of the plumage a mauve tint, deeper in colour on its head, neck, breast, throat, thighs, and under parts generally. Irides pale brown; bill, legs, and feet deep brownish black.

The Jackdaw is much less subject to variation than the Rook. Two piebald varieties only have come under my notice, although I have heard of others both pied and white. On November 11th, 1885, a chocolate-coloured Jackdaw was shot at Middleton, near Lynn, and sent to me to preserve for the Lynn

Museum. It was a female bird, and had irides of a French grey; the back, upper wing coverts, crown of head, throat, and under parts, are chocolate. The usual grey mask is in this specimen of a slaty tint; primaries sandy brown, tipped and margined with grey; secondaries and tail-feathers sandy brown, with broader, greyish margins; the bill, legs, toes, and claws, dark chocolate.

An adult female Waterhen, of piebald colour, was caught by a fisherman in a marsh drain at Drayton, near Norwich, and brought to me alive on December 5th, 1885. A peculiarity in the colour of the irides of this bird was remarkable, one eye being of a deep red, the other hazel. Mr. Booth tells me he has seen a Great Crested Grebe which had eyes of different colours, a peculiarity in bird life seldom noticed.

The Waterhen, although so common in the eastern counties, is subject to but little variation in colour. I have seen but two piebald examples in addition to the two sandy ones already recorded.

Two very large Partridges, both cock birds, were killed in October, 1885, weighing 19 and 19½ ounces, that is three or four ounces heavier than usual.

The Eider Duck is of rare occurrence on the Norfolk coast, but has been met with on three occasions to my knowledge. In the latest instance an immature female was shot at Burgh St. Peter on December 30th, 1884, and weighed 2 lbs.

A fine male Gadwall was killed at Merton November 11th, 1885, and an immature male Long-tailed at Moulton, October 23rd, 1885.

A fine male Spotted Redshank was killed on the marshes at Burton Turf in August, 1885, and sent me by a friend; weight 4 oz. 6 dr. avoirdupois.

In the month of August an unusual number of Wood Sandpipers made their appearance, and were shot in various localities. I had a male on the 13th, a second on the 17th, another on the 23rd, and a male, killed at Thuxton on the 28th, and lastly a female on the 10th of September. All these birds were in immature plumage, and very fat. Their food had consisted principally of small insects.

Two female Water Rails were obtained at Hingham and Horning, December 26th, 1884. The females are much smaller

than the males. Their food consisted of aquatic insects and vegetable matter. On the 23rd of May a nest of seven fresh laid eggs were brought me from Hickling; and a live bird on the 28th of October that had been caught in a marsh drain leading into the Wensum near Norwich. It was apparently a male, and had eyes of a brick-red colour.

An adult Great Black-backed Gull was caught at Cromer by being entangled in some fishing gear, and was brought to me alive on December 16th, 1884. The irides were grey, speckled with fine irregular blotches of brown; the eyelids were of a beautiful reddish orange; gape of mouth same colour, but not quite so deep in tone. The upper mandible was yellow on the anterior half, pale horn on the basal half; lower mandible horn-colour, with fleshy tinge, with the red patch covering the anterior half at the sides, extreme tip pale horn-colour; legs, pale flesh colour, with a slight tinge of pink on the front of the tarsus.

Two small examples of the Bittern came to hand in January. The first, a male, was shot on the 19th at Aylsham by Mr. Purdy. It seemed very tame, allowing the shooter to approach within twenty-five yards of it before it took wing. It was very fat, and the stomach contained the remains of a water-beetle (*Dytiscus marginalis*), which, judging from previous dissections, seems a favourite prey. The second example, a female (also of smaller dimensions than usual) was killed near Lynn on the 26th. It weighed just 18 ounces, and measured $26\frac{1}{2}$ inches in total length, beak and tail included; $45\frac{1}{2}$ inches across the fully extended wings, and $12\frac{1}{4}$ in the wing from carpus.

Solitary individuals of the handsome Greenbacked Porphyrio, *Porphyrio chloronotus*, have been met with in Norfolk on five different occasions (see Mr. J. H. Gurney's note on the subject, *antea*, p. 71), and four out of the five were sent to me for preservation. The last procured (Zool. 1885, p. 482) was shot on October 16th, 1885, on the River Bure, near Horning, as it rose out of some reeds near one of the entrances to Hoveton Broad.

THE LATE CHARLES ROBERT BREE, M.D.

ON the 17th October last at Long Melford, where he had resided since 1881, died Dr. Charles Robert Bree, in the 76th year of his age. Born at Ambleside in February, 1811, he commenced a study of medicine at York, and subsequently became a student in University College, London, ultimately settling down as a general practitioner at Stowmarket. In 1854 he was elected physician to the Essex and Colchester Hospital, and for twenty-two years continued senior physician to that institution, until in June, 1881, an attack of paralysis caused him to resign the post.

As an author he will be best remembered by his 'Birds of Europe not observed in the British Islands.' This work in four vols. royal octavo, with coloured plates, was commenced in 1859, and finished in 1863. Although by no means exhaustive, nor free from mistakes, it was a very useful book in its way, for until the appearance of Sharpe and Dresser's 'Birds of Europe,' in 1871, it remained for more than ten years the only English general work of reference on the subject of which it treated. The first edition having become exhausted, the author prepared a second, which appeared in 1875-1876, in five vols., important additions having necessitated the publication of an extra volume. In this second edition Dr. Bree was assisted by various friends who, as specialists, consented to revise the proof-sheets of different portions of the work for him, thus helping, so far as the text was concerned, to make it much superior to the first edition. In 1872 he published a volume of some 400 pages entitled "An Exposition of Fallacies in the Hypothesis of Mr. Darwin," the nature of which is sufficiently indicated by the title. A series of articles headed 'Popular Illustrations of the Lower Forms of Life,' originally contributed to the Natural History columns of the 'Field,' were afterwards collected and republished in book form. For many years he continued to take an active interest in the progress of Zoology, and from time to time forwarded communications for publication in the 'Field,' the 'Naturalist,' (no longer in existence), and 'The Zoologist.' Even when struck down by paralysis, and no longer able to enjoy the pleasures of a country walk, his active mind found occupation in closely observing the habits of such birds as might be

watched from his window; his latest contributions to this journal being 'Notes on Sparrows' (Zool. 1883, p. 297), and on 'Starlings' (Zool. 1884, p. 231). The study of Entomology, though to a less extent than Ornithology, likewise engaged his attention, and placed him in correspondence with observers all over the country who cultivated similar pursuits. His death, albeit at a ripe old age, and for some time not unexpected, will nevertheless be sincerely regretted by all who had the pleasure of knowing him either personally or through the medium of his writings.

NOTES AND QUERIES.

Animal Life in High Latitudes.—Professor Collett, of Christiania, has offered some criticism on the article which appeared under this heading in 'The Zoologist' for November last (pp. 385—320), and which we think deserves mention by way of supplement to our remarks. Referring to the statement on p. 387, that "Little Auks and Razorbills were common everywhere," Prof. Collett points out that the Little Auk is unknown during summer in Norway, where it is only a winter visitor. He adds that the enormous colony of Gulls at the famous Sværholts-Klubben (also mentioned on p. 387) consists entirely of *Larus tridactylus*, and not, as we supposed, of *Larus canus*. It may be as well to notice these corrections now, lest our statements may hereafter prove to be misleading.—S. O. and H. N. RIDLEY.

MAMMALIA.

Monkeys Swimming.—Whilst we were in the swimming-bath here (San Giuliano), May 23rd, "Pochette," the monkey which we had brought with us, put her fingers into the water and then licked them. Directly she had tasted the water she grew very restless, and at last dived into the bath with such force that she broke her cord and came swimming towards us. But she kept under water nearly the whole time, only coming to the surface to breathe and then diving again. She swims just like a human being or a frog, and keeps her eyes open under water, behaving, in fact, as if it were her natural element. We were very much surprised, as we did not know before that monkeys could or would swim. This monkey was bought at Archachon and the owner called it a "Bonnet Chinois." The colour of the hair is a golden grey, the chest pale blue; a slight tuft on the top of the head.—W. H. STEWART.

[The species of Monkey here referred to under the dealer's name of "Bonnet Chinois" is either *Macacus sinicus* or *M. pileatus*, probably the latter. The first-named inhabits Southern India, the other is confined to Ceylon.—ED.]

Present Distribution of the Beaver in Europe.—Since the publication of your article on "Beavers and their ways" in "The Zoologist" for July last (pp. 265—286), I have felt doubly interested in the existence of these animals on the River Elbe. At Mr. Honstetter's, taxidermist, at Bregenz (Lake of Constance), I had the pleasure of examining a Beaver, shot on that river only a short time ago (Aug. 1886). I ascertained that the animal had been sent to be stuffed, by Dr. Girtanner, of St. Gallen (Switzerland). On my writing to this gentleman, and referring to your paper, he was kind enough to send me some notes on the principal Beaver colonies on the Elbe, as well as the dates when the latest individuals from here were obtained. At the same time he forwarded a monograph on the subject, which I am again to forward to you. He mentions that the Beavers in Merseburg, Anhalt and Dessau, are still living and breeding, and tells me that since writing the said paper (1885) several small and hitherto unknown colonies have been discovered on the Bosna in Bosnia, in Ukraine, and in Transylvania. The Elbe colonies suffered very much through the drought of 1884, as the entrances to their holes along the river-bank were laid bare,—*"was absolut für die Existenz des Bibers unerträglich ist."* Quoting from his paper sent herewith, the Beaver in Bavaria is now quite a thing of the past, and those in Bohemia appear to be not much better off. Especially interesting is his account—the result of many years of research—of the localities still affected by these animals in Scandinavia. The specimen I saw at Honstetter's was a large male, weighing twenty-three kilogrammes, and was shot the 7th August, 1886, near Roslau, on the Elbe. Last year he received two others, weighing respectively fifteen and thirteen kilogrammes, which were stuffed by the best taxidermist in Germany, Kerz of Stuttgart; he has also two skeletons,—all from the Elbe. As they are for sale, and the prices given, I may as well mention it here. Specimen at Honstetter's 250 fr., packing included; do. Kerz, 200 fr., do.; do. 200 fr.; large skeleton, 200 fr.; small do. 150 fr. I do not pretend to judge of the value, and only notice it here in case it may be of use to you; but as Dr. Girtanner himself says, the difficulty of obtaining *Castor fiber* now-a-days is very great, and only unusual floods or a stray shot from a poacher will cause them to abandon the colonies, which are strictly preserved. Dr. Girtanner appears also to be much interested in the former existence of Beavers in Scotland, and in the introduced colony in the Isle of Bute. As I am not acquainted with particulars, perhaps you would let him know something about the latter, either directly or through me. In conclusion, he states that he will be happy to supply any information or hints to any one desirous of establishing a Beaver colony.—G. N. DOUGLASS (Stephanien Strasse, 47, Karlsruhe).

[A full account of the Beaver in the Island of Bute, communicated by Mr. J. Black, the keeper in charge of them, will be found in 'Extinct British Animals,' by J. E. Harting, pp. 52—59.—ED.].

Do Stoats and Weasels kill Moles?—In reference to your editorial note on this subject (p. 457), Weasels are often caught in mole-traps in this neighbourhood, and I believe the general impression is that they are in pursuit of Moles at the time. I think Weasels probably only hunt for Field Mice in the old deserted runs, which the Mice would be more likely to use than those still frequented by the Moles, in which alone traps are set by Mole-catchers, and in which they would run the risk of falling victims to the fiery tempered and sometimes bloodthirsty "Want."—OLIVER V. APLIN (Great Bourton, near Banbury).

Pied Variety of the Short-tailed Field Vole.—A black and white variety of the Short-tailed Field Vole, *Arvicola agrestis*, was caught in a field on the Sewage Farm, Harrogate, on July 21st, by the local taxidermist, and is now in my possession.—FRANCIS R. FITZGERALD (Clifford House, Harrogate). [A black variety is recorded, p. 332.—ED.].

BIRDS.

New Species of Bullfinch from the Kurile Islands.—The ornithological collection in the British Museum has contained for many years a specimen of a Bullfinch, from the Kurile Islands, which is apparently undescribed. Mr. Seebohn also possesses a pair of the same bird, collected by Wossnessensky in the same place. The following is a brief description of the species:—*PYRRHULA KURILENSIS*, sp. n. Adult male; similar to the male of *P. orientalis* of Japan, but much lighter in colour, being pale ashy brown above instead of blue-grey, and pale drab brown below instead of blue-grey, but very faintly tinged with rosy on the breast. Total length 5·3 in., culmen 0·45 in., wing 3·5 in., tail 2·6 in., tarsus 0·7. (Type in Brit. Mus.). Adult female: Not to be distinguished from the female of *P. orientalis*. Total length 6 in., culmen 0·4 in., wing 3·25 in., tail 2·45 in., tarsus 0·7. (Mus. H. Seebohn). Hab. Kurile Islands.—R. BOWDLER SHARPE (Department of Zoology, British Museum).

A Nest of the Long-tailed Titmouse.—A nest about as big, or nearly so, as an Ostrich's egg, built chiefly of green moss, with perhaps a little hair woven in the interior, dappled over with lichen (or the slaty-grey growth found on old apple trees) on the outside, as if ornamentally; entrance about the middle of its height; the nest egg-shaped,—that is, oval,—with completed top and sides: the whole suspended by many strands of spiders' web to a small branch of a yew tree, the spiders'-web threads being so closely and thickly used that they formed almost a small sheet of supports (like a balloon and its net if all were inverted and the net were made of very many strings). Each thread was apparently brought separately by the birds and thrown over the branch, and no tag ends or irregular ends appeared, the top of the nest being thus from one to two inches below the branch or twig. The nest was well sheltered in the tree.

One side of it was slightly torn, exposing the interior, evidently by a cat or some other animal. The old birds were not seen, and the nest when found was deserted, probably by reason of the mischief done by the animal, but evidently built recently.—F. BESANT (Sibsey Vicarage, Boston).

Swallow nesting in a Tree.—You may remember that in the summer of last year I wrote to you concerning a Swallow's nest built on a small tree-branch. You decided not to have the nest, but asked to be informed whether the birds returned this year to their curiously abnormal nesting-site. They have not returned, or at least they have not again built in the old place. It happened, however, that just as the Swallows first arrived here last April we had a few days of continued cold, rain, and storm; the birds were found dead in many instances hereabouts. I think that as many as six were found dead together in one spot, probably starved, as the insects were destroyed—or prevented from appearing—by the ungenial weather. Thus we cannot fairly conclude that the old nesting-place was not again sought. I may add that the young birds last year got off safely. When the tree—a horse-chestnut—lost its leaves in late autumn the rains and frosts soon caused the unsheltered nest to disappear, but before it fell I took a sketch, which fairly shows the position. I enclose the sketch, and of that you will make any use that you think fit. If formal authentication of the circumstances is considered desirable it can be amply supplied.—F. BESANT (Sibsey Vicarage, Boston). [Communicated by Dr. Günther, F.R.S.]

Birds which Sing at Night.—Gilbert White mentions three birds that sing at night, *viz.*, the Nightingale, Wood Lark, and Lesser Reed Sparrow (Sedge Warbler). Mr. Harting, in his edition of 'Selborne,' in a foot-note to this passage (p. 139), adds the Reed Warbler, Grasshopper Warbler, and the Cuckoo. "The Sky Lark often sings very late, and the note of the Corn Crake may frequently be heard in May between 11 and 12 p.m." (*op. cit.*, Editor's note). The Rev. Dr. Benson ('Irish Song Birds,' p. 175) mentions another bird—the Nightjar. He also says, "The Song Thrush and Robin often sing at night. Mr. Arthur Irwin heard a Thrush in full song at 1.30 a.m. at Newtown Mountkenedy, on March 22nd, 1886." I can add another occasional night songster. On the 20th of March last I heard a Blackbird singing most delightfully from some evergreens near my bed-room window. The time was 12.40 a.m. Whether or not it was the light in my room that induced it to break into song I cannot say, but I never heard a Blackbird sing so late (or early) before or since. The Heron may often be seen and heard here about midnight. Many times I have listened to its harsh cry, delivered by the bird high up in the clear air, and afterwards seen it flying in the bright moonlight.—WILLIAM W. FLEMING (Coalfin House, Portlaw, Co. Waterford).

Colouring on the Head of the Mute Swan.—In 'The Zoologist' for 1872 (p. 3112) there is a figure of a Mute Swan's head with markings on it like horns. There is on a pond at Hethersett, near Norwich, a Swan with markings exactly like this picture. They are orange-red in colour, and are the result of the tint so often seen on the occipital feathers of Swans commonly supposed to be an artificial stain from contact with ferruginous sands or other red deposit under the water, which in the present instance has assumed the strange shape of horns, as depicted in the woodcut above referred to.—J. H. GURNEY, jun. (Northrepps, Norwich).

Additions to the Avifauna of the Færoe Islands.—Through the kindness of Mr. Edward Hargitt, I have lately added to my collection two Reeves, *Machetes pugnax*, obtained by Herr H. C. Müller on the 29th September, 1884. The Ruff has occurred in Iceland, but I am not aware of its having been hitherto recorded from the Færoe Islands. In a letter lately received from Herr Müller, he informed Mr. Hargitt that an example of the Little Tern, *Sterna minuta*, had been obtained last summer in Færoe, which is likewise an addition to the Færoese avifauna.—H. W. FEILDEN (West House, Wells, Norfolk).

The Yellow-browed Warbler in Shetland.—An adult bird of the Yellow-browed Warbler, *Phylloscopus superciliosus*, occurred at the lantern of Somburgh Head lighthouse on the 25th September last. It was caught and forwarded to me for identification in the flesh, and is now in the collection at Dunipace House, preserved in spirits, as it was too far gone for skinning. It was sent by Mr. James Youngclaus, formerly lighthouse keeper at Monach Island, where, by his account, a precisely similar bird appeared on one occasion previously. It was in company with a few larks at the time of its striking.—J. A. HARVIE-BROWN (Dunipace, Larbert, N.B.).

Montagu's Record of the White-tailed Eagle in Shropshire.—Can any one help me to clear up the following mystery? Montagu, in his 'Ornithological Dictionary,' says that the *Sea Eagle* from which he took his description was killed by Sir Robert Lyttleton's keeper in Shropshire. On looking to see in what part of the county Sir Robert had property I cannot find that he existed. There is nobody of that name amongst the Baronets or Knights in 1792. In Plot's 'Staffordshire,' however, there is this curious statement—that two *Golden Eagles* were killed on Cannock Chase by Sir Edward Littleton's gamekeeper; and what is more odd, both authors say they were "feeding on a dead sheep." Yet one cannot imagine such an accurate man as Montagu, even if the species were the same, calling Sir Edward "Sir Robert" and placing Cannock Chase in Shropshire, especially as he says his specimen was accompanied by a 'letter from Sir Robert,' and therefore would have his signature attached.

Lord Valentia, too, who gave Montagu the Eagle, and who then lived at Anley Castle, near Bewdley, would at once have corrected his error in geography. I think in some edition of the 'Ornithological Dictionary' I have seen Stoke St. Milburgh mentioned as the place where the Eagle was shot, but I cannot find it. Are there any notes of localities where Montagu's specimens were obtained? Any hints on the subject will be very acceptable.—WILLIAM E. BECKWITH (Eaton Constantine, Iron Bridge, Salop).

Derivation of "Cob," a name for *Larus marinus*.—Referring to the remarks in 'Yarrell' (4th edit. vol. iv. p. 631) upon the use of the name "Cob" for *Larus marinus*, the name appears to have been very generally known formerly,—well enough, indeed, to find a place in two standard dictionaries. In Ainsworth's 'Thesaurus Linguae Latinæ Compendiarius,' Dr. Morrell's edition, 1783, we have "A cob or sea cob, *Larus*," and *Larus* is translated "A sea-mew, cob or gull." Also in the twenty-third edition of Boyer's "Royal Dictionary," abridged, we find "Sea-gull (cob), oiseau aquatique."—OLIVER V. APLIN (Great Bourton, near Banbury).

[The word "cob" appears to have a great many different meanings. Halliwell, in his 'Dictionary of Archaic and Provincial Words,' mentions no less than thirteen. The derivation of the word is given in Prof. Skeat's 'Etymological Dictionary of the English language,' q. v.—ED.]

Black-headed Gull and Common Scoter in Skye.—By an oversight the Black-headed Gull, *Larus ridibundus*, was omitted from my recently printed 'Catalogue of the Birds of Skye' (Proc. Royal Phys. Soc. Edin. 1886, p. 118). It has been observed by me twice in the island, *i.e.*, in May, 1882, and July, 1886, a single bird being seen on each occasion. When writing the paper in question, I was unable to include the Common Scoter in our list, but have since received information of specimens shot by Mr. F. W. Johnson on Loch Bracadale.—H. A. MACPHERSON (3 Kensington Gardens Square, W.).

Storm Petrel in Gloucestershire.—On Oct. 17th my son picked up a Storm Petrel (*Procellaria pelagica*), which he found lying dead on a field-path between Witcomb and Crickly, about four miles east of Gloucester. It had doubtless been blown inland by the great gale on Oct. 15th. I find three previous records of this species in this county. In the 'Journal of a Naturalist' (1829) one is noted, presumably at Thornbury, "after a violent storm, All-hallows Eve, 1824." One was seen on the Gloucester and Berkeley Canal, by the late Mr. E. Bowley, a few years since, though as this specimen was not procured it may possibly have been *P. Leachii*. Another was picked up dead near Charlton Kings, and is now in the possession of Mr. J. P. Wilton-Haines, of this city, who has also become the possessor of the specimen now recorded. Leach's Petrel has also a triple

record : one shot at Maisemore several years ago, one picked up dead under the telegraph wires after a heavy gale in January, 1881, and a third shot on the canal in December, 1881.—H. W. MARSDEN (Gloucester).

The Plumage of the Red-crested Pochard.—The appearance of the young in down of *Fuligula rufina* is not described in the last edition of Yarrell's 'British Birds.' Mr. Seebohm also was apparently unacquainted with it in this stage of plumage, as he cites a description, at second-hand, from Baldamus, which, if not actually incorrect, is at any rate decidedly misleading. Many readers of 'The Zoologist' have probably seen the fine pair of Red-crested Pochards at present living in the Zoological Society's Gardens, Regent's Park. These birds nested there during the past summer, and a single duckling was hatched on or about the 5th of June. The writer watched its growth for a fortnight, and admired the grace with which it captured midges, swimming rapidly to and fro in pursuit of them. The female displayed great jealousy of the drake, snapping her bill at him and driving him away from the young bird. The appended description of its appearance was taken from this young bird on June 12th :—Crown dark brown, this colour being continued in a narrow tapering band along the hind-neck; upper parts dark brown, a white spot on the pinion, another behind the pinion, and a third white spot on the thigh; a slight dark stripe extends through the eye; throat and sides of the neck yellowish, under parts apparently buffy white, probably purest on the abdomen. It will thus be seen that Mr. Seebohm's assumption ('British Birds,' vol. iii. p. 570), that the young has only two pale spots above, is inconsistent with the phase exhibited by this living specimen. It may be interesting to add, that the sex of the downy young of this bird is evidenced even when very young, by the colour of the bill. This bird, a male, had a *reddish* bill like its male parent, even when in down, contrasting with the brown bill of the old duck.—H. A. MACPHERSON (3, Kensington Gardens Square).

Tree Sparrow and Starling in Arran More.—During last May I saw a colony of Starlings breeding in one spot among the cliffs at Arran More. I noticed no birds of this species elsewhere for many miles, and they were strange birds to the natives of the island to whom I referred; they knew them only as "Blackbirds." The Tree Sparrow I remarked repeatedly, always near the same spot. I doubt if I saw more than one pair, which frequented the roof of a cabin and the adjoining fields. The House Sparrow is abundant on the island, and was the only Sparrow seen in County Donegal between Strabane and the sea. I found the Red-throated Diver breeding on the mainland (Co. Donegal), but this I think you recorded last year.—H. M. WALLIS (The Lawn, Reading).

The Siskin a Resident in Co. Wicklow.—I have observed that the Siskin (*Carduelis spinus*) remains throughout the year in this county in

considerable numbers. I noticed a pair of them on May 21st, building their nest at the extremity of a lofty pine branch. It was extremely difficult of access, being no less than fifty feet from the ground, and when I eventually succeeded in reaching it, I found that it had been plundered by Magpies. Subsequently, however, I saw several young Siskins, lately flown from the nest. The song of the male bird is very curious, and is frequently uttered on the wing, as the bird hovers and flutters in a manner similar to the Greenfinch. Since the beginning of the autumn the number of Siskins has largely increased, considerable flocks having arrived from the north.—ALLAN ELLISON (Shillelagh, Co. Wicklow).

Blackcap and Grasshopper Warbler in Wicklow.—The Blackcap is not uncommon in the woods about here, and was more numerous this year than before. I frequently heard and saw the birds in Coollattin Wood, and have watched the male in the early morning sitting on top of one of the small trees in a young plantation, and uttering his fine warble for a considerable time. I have heard him repeat with precision the notes of the Thrushes which were singing close by. On April 27th I noticed the appearance of the Grasshopper Warbler in this locality. The bird is a regular summer migrant here, but very local and sure to escape notice if not closely watched for. On the above-mentioned date I saw several of the birds, being attracted by their whirring notes, among the furze on an uncultivated hill side. They did not, however, make any stay in this spot, but apparently removed to the swampy valley along the River Derry, where they may be heard occasionally through the summer, especially where there are thick furze clumps.—ALLAN ELLISON (Shillelagh, Co. Wicklow).

Ring Ouzel Breeding on the Malvern Hills.—I first observed these birds here on the 27th of August—earlier by a fortnight than reported by Mr. W. Edwards, a naturalist long resident in the place. They were feeding on the berries of the mountain-ash, high up the hill. Though seated within a few yards of the trees, they continued to alight, with a flight sweeping and rapid. The berries were greedily devoured, the trees on the hill-side being speedily stripped. The Ouzels now frequent the plantations near the town, and have a screeching alarm-note when disturbed. They have been known to build here, Mr. Edwards having found the nest in the furze, high on the hill. Though a little larger than that of the Blackbird, it is alike in shape and material; and the eggs are the same, except having a few red spots at the broad end. Comparatively few Ouzels visited the hills, I am told, before the planting of the mountain-ash, which is now a common tree in these parts. A stray bird or two of this species has been observed here during winter.—HENRY HADFIELD (Ventnor).

The Tawny Pipit and Citril Finch at Brighton.—Three Tawny Pipits (*Anthus campestris*) were caught on the downs to the north-east of

Brighton, about the beginning of October last. They were all secured by the same bird-catcher at the same place on different days. On October 14th a Citril Finch was caught near the race-course. This bird is still alive, in the possession of Mr. Swaysland, Upper Russell Street, Brighton.—HERBERT LANGTON (115, Queen's Road, Brighton).

A White-tailed Robin.—On the 18th of October last I saw a Robin with a completely white tail. The bird was tame enough to allow me a fairly long and close inspection, and with the exception of the tail, every feather of which appeared to be white, the colour of the bird was normal.—E. P. LARKEN (Gatton Tower, Reigate).

MOLLUSCA.

Experiments to test the Strength of Snails.—Perceiving a Common Snail (*Helix aspersa*) crawling up the window-blind one evening, it occurred to me that I would try what weight it could draw after it perpendicularly. Accordingly I attached to its shell four reels of cotton which happened to lie on the table, fastening one after another, until I ascertained that a greater load would exceed the limit of its strength. I then weighed the entire load and found it to be two ounces and a quarter, while the snail itself weighed only a quarter of an ounce. Thus it was able to lift perpendicularly nine times its own weight! I then made an experiment with another and somewhat larger snail, which weighed about one-third of an ounce, the load being composed chiefly of the same materials as the last, but so placed as to be drawn in a horizontal position on the table. Reels of cotton to the number of twelve were fastened to it, with the addition of a pair of scissors, a screwdriver, a key, and a knife, weighing altogether seventeen ounces, or fifty-one times the weight of the snail. The same snail, on being placed on the ceiling, was able to travel with four ounces suspended from its shell. I next tried it on a piece of common thread, suspended and hanging loose, with another snail of its own weight, which it carried up the thread with apparent ease. After this I tried it on a single horse-hair strained in a horizontal position, but it had then enough to do to crawl over this narrow bridge without a load.—E. SANDFORD (The Gardens, Dale Park, Arundel).

ARCHÆOLOGY.

A Christmas Bill of Fare in 1800.—In a collection of miscellanea relating to inns and their signs, formed by a certain Mr. G. Creed, and now preserved in the British Museum, I found a curious document headed "Bush Inn [Bristol], Bill of Fare for Christmas, 1800." It is, I think, well worth reproduction, as showing the variety of fish, game, and wildfowl which was procurable during the winter months at the commencement of the

present century. The list runs as follows:—1 Bustard, Red Game, Black Game, 1 Turtle (120 lbs.), 1 Land Tortoise, 72 Pots Turtle (different prices), [9 kinds of soup], 3 Turbots, 4 Cods, 2 Brills, 2 Pipers, 12 Dories, 2 Haddocks, 14 Rockfish, 18 Carp, 12 Perch, 4 Salmon, 12 Plaice, 17 Herrings, Sprats, 122 Eels, Saltfish, 78 Roach, 98 Gudgeons, 1 Dried Salmon, Venison (1 haunch hevier, 5 haunches doe, 5 necks, 10 breasts, 10 shoulders), 42 Hares, 17 Pheasants, 41 Partridges, 87 Wild Ducks, 17 Wild Geese, 37 Teal, 31 Wigeon, 16 Bald Coots, 2 Sea Pheasants, 3 Mews [? Gulls], 4 Moorhens, 2 Water Drabs, 7 Curlews, 2 Bitterns, 81 Woodcocks, 149 Snipes, 17 Wild Turkeys 18 Golden Plovers, 1 Swan, 5 Quests [Woodpigeons], 2 Land Rails, 13 Galenas [Guineafowl], 4 Peahens, 1 Peacock, 1 Cuckoo [!], 116 Pigeons, 121 Larks, 1 Sea Magpye [Oystercatcher], 127 Stares [Starlings], 208 small birds, 44 Turkeys, 8 Capons, 19 Ducks, 10 Geese, 2 Owls [!], 61 Chicken, 4 Ducklings, 11 Rabbits, 3 pork griskins, 11 veal burrs, 1 roasting Pig, Oysters, stew'd and collop'd, eggs, Hog's pudding, ragoo'd feet and ears, scotch'd collops, veal chops, harricoed mutton, Maintenon chops, pork chops, mutton chops, rumpsteaks, joint steaks, pinbone steaks, sausages, Hambro' sausages, tripe, Cow heels, knotlings, 5 house Lambs, Veal (3 legs and loins, 2 breasts and shoulders, 2 heads), beef (5 rumps, 3 sirloins, 5 rounds, 2 pieces of 5 ribs each, 7 pinbones), Dutch and Hambro'd beef, mutton (8 haunches, 8 legs, 8 necks, 11 loins, 6 saddles, 6 chines, 5 shoulders), pork (4 legs, 4 loins, 4 chines, sparibs, half a porker), *Cold*: 1 Boar's head, 1 baron beef, 2 hams, 4 tongues, 6 chicken, Hog's feet and ears, 7 collars brawn, 2 rounds of beef, collared veal, do. beef, do. mutton, do. Eels, do. Pig's head, Dutch tongues, Bologna sausages, Paraguay pies, French pies, mutton pies, Pigeon pies, venison pasty, sulks [?], 430 mince pies, 13 tarts, jellies, crawfish, pickled Salmon, Sturgeon, pickled Oysters, potted Partridges, Lobsters, 52 barrels Byfleet and Colchester Oysters. Milford and Tenby Oysters, 4 pine apples. It will thus be seen that there were eighteen kinds of fish and forty kinds of birds included in this comprehensive *menu*. Among the latter, the most extraordinary are certainly the Cuckoo and the two Owls. The document is marked "Unique—£1 1s.," also "Very rare and curious." It seems to have been purchased at Hone's sale. "The Bush" was long the principal inn in Bristol, but has long since disappeared.—MILLER CHRISTY (Chignal St. James, Chelmsford).

[The difficulty of procuring a "Cuckoo" at Christmas casts a doubt upon this item. The name is probably a misprint for "Curlew"; and "2" owls "coming between "Geese" and "Chicken," should doubtless be read "Fowls." Who would eat two Owls and a Cuckoo at Christmas, even if he could get them?—ED].

SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

November 4.—WILLIAM CARRUTHERS, F.R.S., President, in the chair.

The President, in welcoming the Fellows to the first meeting of the new session, made some remarks on the work which had been done during the recess, and in a passing tribute commented on the loss which Science and the Society had sustained by the decease of Mr. G. Busk, a former Secretary and Vice-President of the Society.

The President afterwards drew attention to stained specimens, under the microscope, of phosphorescent organisms (chiefly *Ceratium tripos*) obtained by him in the Firth of Clyde in September last.

Mr. John Murray, in commenting thereon, observed that near Cumbræ Islands an immense quantity of yellow material containing these organisms in abundance was obtained at every haul of the net. He alluded to his own observation of the species in long chains in the ocean (Narr. Voy. of 'Challenger'), and to Klebs' opinion of *Ceratium* being a genus of unicellular Algæ, and not an infusorian animal, as ordinarily inferred.

Dr. F. Day exhibited a Salmon Parr twenty months old, raised at Howietown from parents which had never visited the sea. Dr. Day also showed some coloured drawings made in October, 1886, at Howietown, of hybrids raised there. One of these was a cross between the American Charr and the Loch Leven Trout, another a cross between the American and the British Charr, and a third between the last-mentioned hybrid and the Loch Leven Trout; all these were fertile.

Mr. F. P. Pascoe exhibited one of the round olive-green balls from Sicily, formed by the action of the sea on fragments of the *Posidonia caulinia*, and reduced after a few days' exposure to a flat cake-like body densely covered with minute crystals of salt. He also exhibited examples of a remarkable mode of growth of the acorn-shell (*Balanus*). It would appear that several individual animals had united their shells to form a tube common to them; the outer valves of each individual also had more or less lengthened, forming a series of irregular subsidiary tubes radiating from the apex of the primary one.

Mr. Edward C. Bousfield read a paper "On the Natural History of the Genus *Dero*." After a summary of the literature, and remarks on the confusion existent in the nomenclature, he showed that *Naias digitata* of Müller cannot now be identified, and the specific name should accordingly be rejected. A full account is given of the habits of the Deros, and the best methods of observing them; the points in which they differ from the Naides were pointed out, and the chief peculiarity of the genus described,

viz., the respiratory apparatus at the end of the tail. Mr. Bousfield then gave the diagnoses of seven species, of which all are figured, four being new to Science.

Mr. Stuart O. Ridley read a paper "On the Genus *Lophopus*, with Description of a New Species from Australia." The latter was obtained by Dr. Von Lendenfeld near Sydney, N.S.W., and is distinguished from *L. crystallinus* chiefly by the great length of the tentacles, which equal that of the body of the polypide, and by the oval non-pointed outline of the statoblast. The new form, *L. Lendenfeldi*, is the fourth fresh-water Polyzoon recorded from Australia, and the first species of its genus satisfactorily determined from the Southern Hemisphere. Staining with borax-carminé brings out certain multipolar nucleated cells in the ectocyst, which appear not to have been previously described in this genus. They perhaps indicate that the ectocyst contains mesodermal elements, and hence is something more than a mere epithelium. The characters of the species in question necessitate a modification of the old diagnosis of the genus as regards the shape of the statoblast.—J. MURIE.

ENTOMOLOGICAL SOCIETY OF LONDON.

November 3, 1886.—ROBERT M'LACHLAN, Esq., F.R.S., President, in the chair.

The following gentlemen were elected Fellows, *viz.*, Mr. Peter Cameron, of Sale, Cheshire; Mr. F. Archer, of Crosby, Liverpool; Mr. H. J. S. Pryer, of Yokohama, Japan; Mr. H. Norris, of St. Ives, Hunts; Mr. N. P. Fenwick, of Surbiton Hill; Mr. John Brown, of Cambridge; Mr. J. P. Tutt, of Blackheath; and Mr. A. P. Green, of Colombo, Ceylon.

Mr. E. B. Poulton exhibited a mass of minute crystals of formate of lead, caused by the action of the secretion of the larva of *Dicranura vinula* upon suboxide of lead. He stated that a single drop of the secretion had produced the crystals which were exhibited; and he called attention to the excessively high percentage of formic acid which must be present in the secretion, and to the pain, and probable danger, which would result from being struck in the eye by the fluid which the larva had the power of ejecting to a considerable distance. A discussion ensued, in which Messrs. White, Kirby, Slater and others took part.

Mr. S. Stevens exhibited a specimen of *Laphygma exigua*, recently captured by Mr. Rogers in the Isle of Wight.

Mr. W. F. Kirby exhibited, and read notes on, a specimen of *Perilampus maurus*, Walk., recently bred by Mr. Walter de Rothschild from *Antheræa tirrhea*, Cram., one of the rarer South African Saturnidæ.

Mr. T. W. Hall exhibited a number of specimens of *Xanthia fulvago* (*cerago*), somewhat remarkable in their variation, and showing a nicely

graduated series, extending from the pale variety *flavescens* of Esper, to an almost melanitic form.

Mr. Boyd exhibited, and made remarks on, the larva of a species of *Ornithoptera* from New Guinea.

Mr. H. Goss exhibited a series of *Bankia argentula* collected by him in Cambridgeshire, in June last; and also, for comparison, a series of specimens of the same species taken at Killarney in June, 1877. It appeared that the Irish form of the species was larger and more brightly coloured than the English form.

Mr. Eland Shaw exhibited a female specimen of *Dectictus verrucivorus* (Linn.), taken in July last, at St. Margaret's Bay, Kent.

Mr. Waterhouse recorded the recent capture of *Deiopeia pulchella* at Ramsgate, by Mr. Buckmaster; and the capture of *Anosia plexippus* at Gibraltar was also announced.

Mr. J. W. Slater read a paper on "The relations of insects to flowers," in which he stated that many flowers which gave off agreeable odours appeared not so attractive to insects as some other less fragrant species; and he stated that Petunias, according to his observations, were comparatively neglected by bees, butterflies and Diptera. Mr. Distant, Mr. Stainton, Mr. Weir, Mr. Stevens and the President took part in the discussion which ensued, and stated that in their experience Petunias were often most attractive to insects. Mr. Stainton referred to the capture by himself, of sixteen specimens of *Sphinx convolvuli* at the flowers of Petunias, in one evening in 1846.

Jonkeer May, the Dutch Consul-General, asked whether the reported occurrence of the Hessian Fly (*Cecidomyia destructor*) in England had been confirmed. In reply Mr. McLachlan stated he believed that several examples of an insect thought to be the Hessian Fly had been bred in this country, but that everything depended upon correct specific determination in such an obscure and difficult genus as *Cecidomyia*.—H. Goss, *Secretary*.

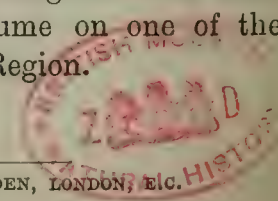
NOTICES OF NEW BOOKS.

Avifauna Italica. Elenco delle specie di Uccelli stazionarie o di passaggio in Italia, colla loro sinonimia volgare e con notizie piu specialmente intorno alle migrazione ed alla nidificazione. Compilato dal Dottore ENRICO HILLYER GIGLIOLI. 8vo. Firenze, 1886.

It is now some fifteen years since Count Salvadori published his work on the birds of Italy, a work which has been of the

utmost utility to all students of the avifauna of Southern Europe. Since that time the learned ornithologist of Turin has been occupied with the study of the birds of far-distant countries; the enterprise of Italian naturalists in various quarters of the globe having furnished material for several books of the greatest scientific importance. The interest attaching to the Ornithology of Italy has, however, not been lost sight of in that country, and the pleasing task of forming a standard collection of Italian birds has been a labour of love to Professor Giglioli, of Florence, the results of whose studies are now given to the world in a bulky volume of 600 pages.

This work has been published under the auspices of the Italian Minister of Agriculture, Industry, and Commerce, and is one of the most important contributions to the ornithological literature of the day. Although primarily written for his countrymen, as a guide to the study of their own birds, the work will have a further significance, as it embodies the most complete catalogue of the birds of Italy yet published, and gives most careful details of the distribution and migrations of the species which visit that country. The Italian zoological region embraces, according to Professor Giglioli, not only the peninsula of Italy, but the islands adjacent, such as Malta, Linosa, Lampedusa, Lampione, and Pantellaria. These, with Sardinia and Sicily, form the insular province of the Italian region. The continental or northern province comprehends the Alps, Piedmont, Ticino, Lombardy, Emilia, Venice, Trentino, Istria, and the coast and islands of Dalmatia. On the west it follows the Apennines to the Maritime Alps, and on the east terminates on the Adriatic near Rimini and Pesaro. The rest of Italy with Corsica forms the Peninsular or southern province. Of the 443 species of Birds recorded as Italian, 207 are residents, 69 are summer and 36 spring visitants, 9 of regular passage, 8 of irregular passage, 28 of uncertain occurrence, 80 occasional stragglers, and 6 are doubtful. Great care has been bestowed on the collection of vernacular names, and altogether this work will be recognised as an authoritative volume on one of the most interesting districts of the Palæarctic Region.



THIRD SERIES.]

JANUARY, 1886.

[Vol. X., No. 109.]

JAN 1886

THE ZOOLOGIST

A Monthly Journal

OF

NATURAL HISTORY.

EDITED BY

J. E. HARTING, F.L.S., F.Z.S.

MEMBER OF THE BRITISH ORNITHOLOGISTS' UNION.

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
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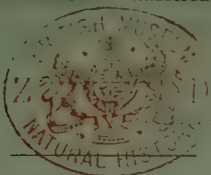
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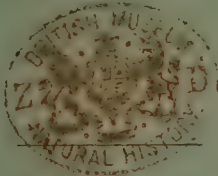
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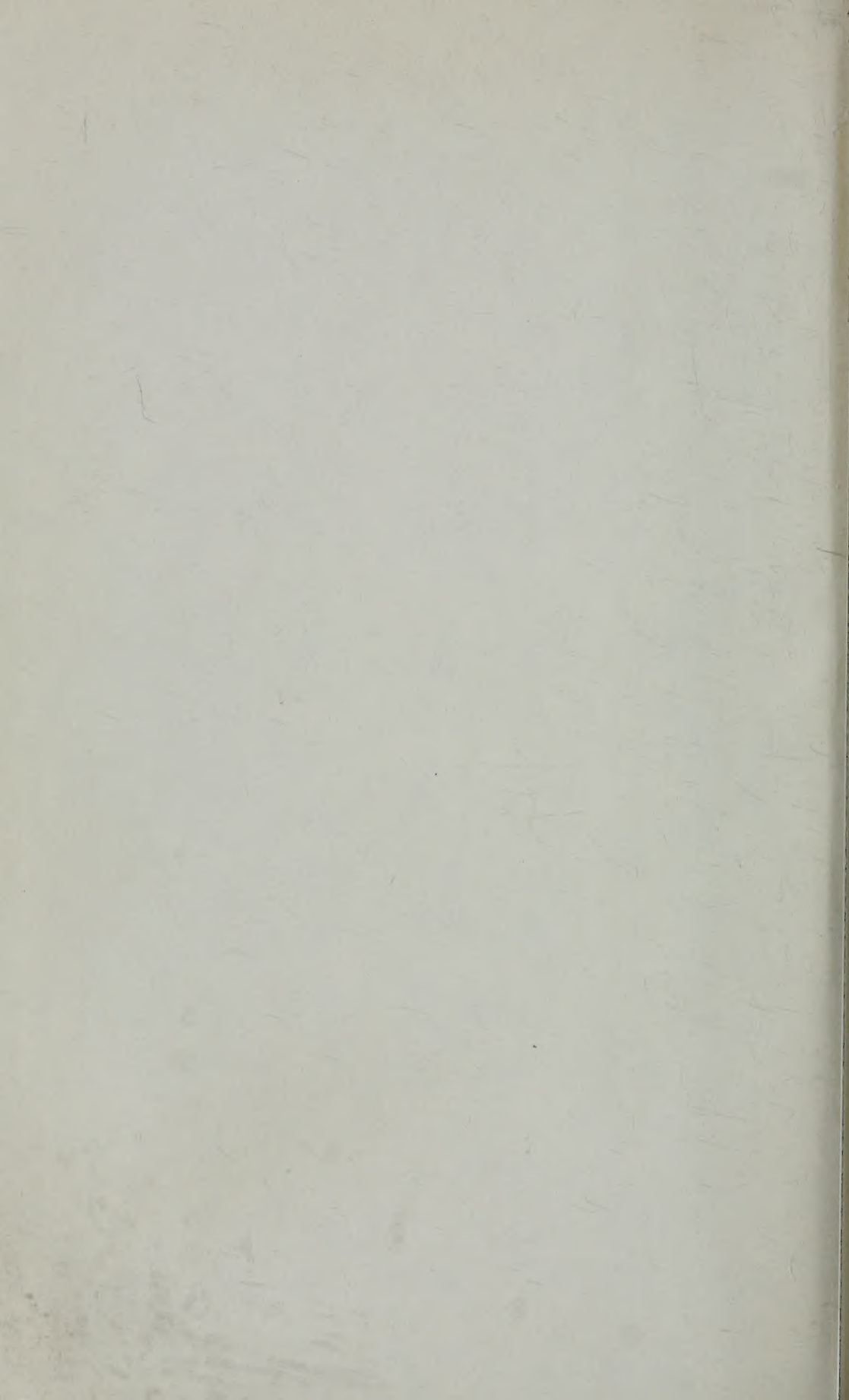
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